CONTENTS.

EDITORIAL NOTES—*Gas, Lighting, &c.*:— PAGE
The Proceedings of the British Association of Gas Managers at Birmingham . 1115
The Gas Agitation in Norwich 1116
Glasgow Corporation Gas Supply 1116
Field's Analysis for 1880 1116
Water and Sanitary Affairs:—
Position of the Water Companies in view of Contemplated Changes in the Municipal Government of London 1117
Testimony of Professor Wanklyn and Mr. W. J. Cooper to the Purity of the Metropolitan Water Supply 1117
Half-Yearly Meeting of the Chelsea Water-Works Company 1117
What is a Domestic Supply of Water? 1117
The Destruction of Town Refuse 1118
Leading Article:—
The Castor Oil Gas-Works at Jeypore 1118
Notes:—
A New Powerful Gas-Burner—A New Gas Heating-Stove—A Gas-Fired Locomotive—The Velocity of Light 1119
Legal Intelligence:—
High Court of Justice—Queen's Bench Division—Board of Guardians of Liskeard Union, *Appellants*, *v.* Liskeard Water-Works Company, *Respondents* . . . 1119
Thames Police Court—A Water Company Fined for Defective Supply 1120
Lambeth Police Court—Unfounded Complaint against a Gas Company. . . . 1120
Parliamentary Intelligence:—
Private Bills relating to Gas, Water, &c. 1121
Progress of Bills in the House of Lords 1121
Miscellaneous News:—
Doncaster Corporation Water Supply 1120
The Electric Light in the House of Commons 1120
Sale of Gas and Water Shares 1121
West of Scotland Association of Gas Managers 1122
Metropolis Water Supply 1122
Glasgow Corporation Gas Supply 1122
Meeting of the Huelva Gas Company 1123
Meeting of the Malta and Mediterranean Gas Company 1157
Brighouse Local Board Gas and Water Supply 1158
Meeting of the Chelsea Water-Works Company 1158
Notes from Scotland 1159
Burnley Corporation Gas and Water Supply 1160
Ticehurst Gas Company 1160
Register of Patents:—
Applications for Letters Patent 1123
The Quality of the London Gas Supply 1123

SUPPLEMENT.

British Association of Gas Managers—
Papers Read—
On the Treatment of Gas in Condensation, as Effected by St. John's Apparatus. By Mr. R. P. Spice 1137
On Gas Supply, both for Heating and Illuminating Purposes. By Dr. C. W. Siemens 1141
The Advantage of the Regenerative System of Heating. By Mr. G. E. Stevenson 1150

TO ADVERTISERS.

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TO CORRESPONDENTS.

ASTRA.—*There is not one.*
J. T. S.—*Next week, after the publication of the paper.*
W. S.—*On their value to the supplier. There is thus no maximum rate; the figure depending solely on the consumption.*
F. M. H.—*Thanks for forwarding report. Our own representative was, however, present; and his account appears elsewhere to-day.*
W. F. C.—*Letter, &c., to hand. We may notice something of it next week.*
ERRATUM.—*In our report last week of the discussion that took place at Birmingham in reference to the change in the constitution of the British Association of Gas Managers, Mr. Gandon was made to say that the life subscription of a member of the Institution of Civil Engineers was fifteen guineas. This was a misprint for fifty guineas.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 28, 1881.

THE PROCEEDINGS OF THE BRITISH ASSOCIATION OF GAS MANAGERS AT BIRMINGHAM.

IN the Supplement to the present number of the JOURNAL we give the first instalment of papers read and discussed at the Birmingham meeting of the British Association of Gas Managers, beginning with Mr. R. P. Spice's communication on the working of the St. John condensing apparatus at Rochdale. The meeting had just previously agreed to the appointment of a technical Committee for the authoritative investigation of doubtful points in the manufacture of gas, among which the functions and performance of various kinds of apparatus would naturally be included. The necessity for this step was unquestioned; but if there had been any present who might have felt disposed to doubt the reality of the work which such a Committee would be called upon to do, the first paper submitted to the meeting must have convinced them. It is without any disrespect to Mr. Spice that we may here express the opinion that, with an investigating Committee in the background, such a paper as his would never have been brought forward. It was clear and very much to the purpose—from Mr. Spice's point of view—but in other respects it fell far short of what the Association had a right to expect from the author. Mr. Spice is not an unknown man who might be sharply reproved and ultimately silenced if found to indulge in strange and unscientific language, and therefore he should exercise the more caution in making statements which are intended to be taken as facts. On the present occasion, he did not—as it may be thought he would have done—lay bare the inner principles and conditions of working of an apparatus of which less was known than surmised; but, without referring even to an illustrative diagram, he gave the barest possible verbal outline of the construction of the apparatus, and immediately afterwards plunged into the statistics of the working of the entire establishment in which one of the appliances is fixed, and brought forward a mass of figures to prove the astounding proposition that a gross economy of nearly £6000 per annum is realized at Rochdale, solely by the use of a St. John condenser. We all know that figures handled in a proper manner may be made to prove anything—at least, on the surface; but it was too much to expect an assemblage of practical gas managers to follow Mr. Spice in his interpretation of facts and figures which are undoubtedly true in themselves. It may be taken for granted, as was admitted by Mr. T. O. Paterson, who watched the apparatus working on its first introduction to Rochdale, that it is successful in improving the gas passed through it in contact with warm light tar; but it is by no means certain that it effects this end more completely than simpler means which can be arranged at a much smaller cost. Mr. Spice's figures were numerous enough to prove many things in regard to the management of the Rochdale Gas-Works besides the success of the St. John apparatus; but when, as sought by the author, they were tied down to serve the purposes of his paper and nothing more, they were singularly inconclusive. Many speakers in the course of the discussion exposed some of the weak points in Mr. Spice's arguments, and it is quite unnecessary for us to go over them again. The best description of the principle of the apparatus was that suggested by Mr. Gandon, who asked if it were not strikingly similar in action to an Aitken and Young analyzer; while the most damaging criticism on Mr. Spice's manner of stating his case was that emanating from Mr. Carr. In his reply, Mr. Spice displayed his well-known power of fence, and spoke with a happy daring which dazzled his hearers; but whether he succeeded in refuting the objections that had been raised is a question which can best be answered by individual opinion after diligent perusal of our report.

Dr. Siemens's paper was regarded with a curiously divided feeling by many of those who attended the evening meeting. There was, of course, the prevailing impression of respectful consideration, due to the reader's eminence, and of admiration for the manner—as illustrated in his gas and coke fire and his new regenerative burner—in which his genius continues to manifest itself in fresh fields; but accompanying and underlying these was the impression that Dr. Siemens had strayed out of his latitude in opening up the principles of economic gas supply to the general public. He seemed to regard as sacred the opinions held by himself in 1863 with reference to the distribution in Birmingham of a special supply of heating gas, and to consider it was necessary to maintain them at the present day. That his opinions should have remained unchanged for eighteen years speaks well for Dr. Siemens's constancy, although not necessarily for his sagacity. Following a celebrated saying, it may be remarked that many things have been changed since then, and the prospect of a new gas superseding the common article has certainly not altered for the better. Dr. Siemens, however, did not bring forward, in the light of a plea for the establishment of a new industry, the advisability of the manufacture of a special gas for fuel; but suggested that lighting and heating gas should be made from the same coal and in the same retorts. The beginning and ending of every charge is best suited, in his opinion, to the production of heating gas, while the lighting gas would be taken from the middle two-thirds of the duration of the charge. In this way Dr. Siemens, following the results of experiments conducted by M. Ellissen, of Paris, anticipates that from common coal a gas of at least eighteen candles illuminating power can be obtained, with a further separate portion of gas of about nine-candle power, to be sold for heating purposes only. He

considered that a higher price than is now obtainable for average gas would be readily paid by the public for the first quality gas, thus enabling the heating gas to be supplied at a profit through a separate system of mains and services. The fallacy of this assumption scarcely needs detailed exposure. Setting aside the more obvious difficulties of manufacturing and selling gas by candle power, it will be seen that, unless a perfect balance exists between the ratios of gas consumption for heating and lighting, the whole system fails. This we regard as the gravest fault of the idea, for it cannot be overcome. There is, moreover, a sad economical blunder concealed in the idea of selling a portion of the same bulk, whether of gas or anything else, dearer in order that another portion may be sold cheaper than the mean value of the whole. To take a simple illustration, it is cheaper to buy beef in the carcase than to pay a high value for the prime cuts and a lesser rate for the coarser joints, with the butcher's profit on the cutting-up included. So is it better to sell all the gas from a charge of coal, taken at a fair average quality, at the cheapest possible rate, and through one channel for distribution, leaving the consumer to use it for lighting or heating as he pleases, instead of breaking up the gas production into two classes. As might have been expected, the best debated portion of Dr. Siemens's paper was that in which he ventilated his theory of duplicate gas supply, though the most original and characteristic part of it was that which dealt with the improved gas-burner shown—we believe for the first time—on the table. If anything like Dr. Siemens's rough results can be obtained in the usual way with burners of this design, a new impetus will be given to invention in the direction of utilizing the latent light-giving power of gas. To this search it would be in vain to fix an even approximate limit. We know, with some approach to certainty, how much heating power gas may be said to possess, although we may never be able to avail ourselves of it to the fullest extent; but the property of affording light is infinitely more difficult to value, and its hidden laws may yet have many and great surprises in store for us. The capital made by the President out of the inventions of the brothers Siemens, when stoutly upholding his own faith in the future of coal gas as against electric light, was in the happiest manner, and was rendered available for qualifying many of Dr. Siemens's statements by his own actions. We do not care to follow Dr. Siemens in his predictions of the ultimate disuse of gas as an illuminating agent, but we cannot express the smallest objection to his prophesying whatever he pleases, so long as he and his brother of Dresden will only continue to invent good gas-burners.

With respect to Mr. G. E. Stevenson's paper on regenerative retort heating, we must confess to a feeling of disappointment. The author was before the same audience last year with a very similar story; and comparison of the two papers, while proving the greater care bestowed on the later example, fails to indicate much advance in point of practice. The present paper was ill-adapted for reading, though of decided value as a contribution to the literature of the subject. Still, even from this point of view, it was late. Mr. Stevenson told his hearers that he had purposely confined himself to theory, in order that results, when independently given, might be readily appreciated at their true value, and referred to the proper causes. This is very excellent in its season, but, as Mr. Chew remarked, there is plenty of information of this character to be found. There is not an ordinarily intelligent gas manager in the kingdom who has not a pretty fair notion of the principles of the regenerative gas furnace; and what is now wanted is not more formulæ of the proportions of carbonic oxide, hydrogen, and nitrogen in an ideal furnace gas, but plain, simple observations and instructions from those who can speak from every-day experience of generator firing in this country. These Mr. Stevenson did not give, and it is to be regretted that he should have so widely misconstrued the undoubted curiosity that exists regarding the generator system, as to give a series of calculations and a drawing of a setting which is not erected, instead of the hard facts for which his hearers were waiting. Mr. Greenough, who had just returned from a tour of inspection through the German works, and Dr. Siemens himself, touched upon some of the points upon which practical men, about to embark in generator construction, demand every available scrap of information; and, on the whole, it may be conceded that some progress was made in the popular elucidation of a subject which is of the most pressing importance. Indeed, although we have been compelled to take exception to much of the matter of the three papers here dealt with, it must be agreed that they all gave rise to most interesting and profitable discussion, and were therefore of considerable use. We shall return to the consideration of the other papers and discussions next week.

THE GAS AGITATION IN NORWICH.

It is a curious study to observe the evolutions of the self-constituted gas reformers of Norwich. Recently, when the charge for the public lighting was popularly supposed to be excessive, the Secretary to the Gas Company somewhat astonished the cavillers by announcing that the cost to the town of the gas consumed in the public lamps was not more than 2s. 6d. per thousand cubic feet on the existing contract. The local economists, however, soon recovered themselves, and, by way of taking the Company at their word, proposed that the public lighting contract should be renewed on the meter system, at the rate stated by the Company. The latter have since agreed to these terms, possibly with a desire for a quiet life in the town; and it therefore appears probable that the street lamps will henceforth be lighted on the basis of actual consumption, calculated on the above rating, until permanent arrangements for metering and regulating, in accordance with the wishes of the Council, can be concluded. The Company, as we have previously remarked, have treated the demands of the Local Authorities with the most deferential consideration, and have yielded, in reason, upon every disputed point in respect of which the Council have been able to make up their minds what to ask for. It will, of course, be understood that, in spite of all this, the local gas agitators are not happy, although there are not wanting signs to show that the agitation is almost played out. The policy of attempting by concessions, not merely just, but even excessive, to pacify noisy discontent, has been tried by many Gas Companies before this, and with indifferent success. We shall be curious to see how matters go on in Norwich, but our present opinion is, that if rigid justice will not serve to allay agitation, generosity will be wasted, and will only serve to feed the fire. There is even now an indication of the spirit in which reductions in the cost of the public light may possibly be regarded by those whose interest lies in being dissatisfied. It was remarked at the meeting of the Council, when the Gas Company's offer was accepted, that the private consumers would not long be content to pay a large additional percentage over the price charged to the public body. This prophecy may or may not be true in reference to the special circumstances, but it appears to indicate pretty accurately the popular feeling with regard to favours extended to public, as compared with private consumption, by Gas Companies who think by so doing to stop local clamour.

THE GAS SUPPLY OF GLASGOW.

The gas undertaking of the Glasgow Corporation has during the past year continued to expand, although with a steady rather than large process of extension; still a consumption which increased during the year by 26 million cubic feet is manifestly of full vitality. The gas is of the highest character, generally considerably exceeding twenty-five candles illuminating power, and consequently goes farther in general use than the moderately brilliant product of most southern works. A surplus profit of £13,782 for the year has encouraged the Gas Committee in making another reduction in the price of gas from the 31st ult., and the rate now stands at 3s. 8d. per thousand cubic feet, with every probability, we should say, of an early diminution. The manufacturing stations did not require extension during the past year, and are said to be equal to all probable demands upon them for some considerable time. The works are in good order, and it is known that Mr. W. Foulis, the Gas Engineer to the Corporation, is continually introducing improvements in the plant and apparatus in use. There is yet a wide field in Glasgow for the extended consumption of gas, and the sound policy of the Committee will go far towards popularizing it, and extending the range of utility of their excellent product.

FIELD'S ANALYSIS FOR 1880.

The useful "Analysis of Metropolitan Gas Companies' "Accounts" annually issued by Mr. Field has this year assumed another and more extended form. From 1869, when Mr. Field first took up the enterprise of compiling a synoptical statement of the working of the then existing thirteen Metropolitan Gas Companies, the number of separate entries has steadily decreased, until for the past year only four representatives of the original organizations remain. The "survival of the fittest" has been demonstrated to the uttermost during the past eleven years in this connection, and it became correspondingly plain that Mr. Field's work was growing ominously compact, although its interest

remained as great as ever. Hence he has wisely considered the practice of the Registrar-General, who takes cognizance, in his returns relating to the Metropolis, of that Greater London beyond the old municipal limits wherein the large majority of those who swarm in the streets of the town by day, retire to live their real social existence. Mr. Field has therefore included in his purview the suburban Gas Companies, which lie all round the central region to which his previous labours have been confined, and the doings of fourteen outlying undertakings ranging from Barnet to the Crystal Palace, and from Richmond to Lea Bridge, are now brought together for comparison among themselves and with the more properly so-called Metropolitan establishments. Referring to the latter, we find that the total amount of capital sunk in the gas supply of London is £13,025,954, or an average of £6 17s. 3d. per ton of coal carbonized. Much is occasionally heard in regard to the heavy capital expenditure of the London Companies; but it is now shown by Mr. Field's figures that the outlying districts are far more heavily burdened in this respect, the £1,829,760 of capital employed by the Suburban Gas Companies being equivalent to an average of £7 9s. 4d. to the ton of coal carbonized. The lightest charge for capital of all the eighteen Companies cited by Mr. Field is the Wandsworth, with £4 18s. 10d. per ton, and next comes the South Metropolitan, with £5 0s. 10d. per ton; while the heaviest proportion is that of the Barnet Company, which is estimated for gas as equal to £18 14s. 6d. per ton, so that in comparison with many of the smaller outside Companies, even The Gaslight and Coke Company is lightly burdened. Great differences exist in the proportions of unaccounted-for gas; but the West Ham Company are credited with the smallest loss, of only 1·77 per cent on their make, while the Colney Hatch are taxed with a waste of 13·45 per cent. We must naturally expect to find greater differences between the results recorded by the outlying Companies than with the more level conditions of the four Metropolitan Companies; these latter, in fact, run together with striking uniformity. The South Metropolitan Company, as usual, paid about a shilling per ton less for coal than their neighbours, and their manufacturing and distributing charges were also the lowest. The total working expenses of this Company per thousand cubic feet of gas sold, including coals, but less residuals, were 19·27d., being below any other Metropolitan or Suburban Company, calculated on this basis; the highest expense being incurred by the Lea Bridge Company, amounting to 37·55d. per thousand cubic feet There is indeed scarcely an end to the instructive commentary which might be made on this excellent and exhaustive compilation; and we must therefore restrain ourselves, and commend the book to the study of such of our readers as may be interested in the matters with which it deals.

Water and Sanitary Affairs.

Sir William Harcourt is enlarging his programme to an extent which indicates considerable faith in the opportunities the future is to afford him. The Home Secretary is ready to reform London, and to create a new Billingsgate. He hopes the House of Commons will before long have time to address itself to the former question; and as for the latter, he has given a plain invitation to the Metropolitan Board to provide a fish market for the population outside the City. If they will undertake the task he says he will help them, and he doubts not but that Parliament will support any well-considered scheme that may be thus devised. We suppose Sir William has not forgotten the juvenile offenders, and the Metropolitan Water Supply. If municipal reform is so near at hand, it would seem absurd to create a temporary Commission to take charge of the property of the Water Companies. If the reform of the municipal government of London is yet remote, the water question may require independent treatment. But if the municipal question comes to the front, the water supply must await the issue. *The Times*, in a recent leader, inclined to the idea of separate authorities for different functions, after the Fortescue model. Confessedly the method would be "a makeshift;" but we are told that "under a separate system of control for lighting, for water, for street paving, and street architecture, and for all the other prime necessities of urban life, the danger and mischief of blundering and jobbery would, at all events, be distributed." If the risks are to be "distributed," of course there is an end to that concentration and unity of which so much has been said. If London is to witness "the committal of different functions to different bodies conterminous with the area within which the functions have to be exerted," the Metropolitan Water Companies may as well be allowed to continue in existence, especially as the outer limits of their districts cannot be made "conterminous" with the lines which will limit the other authorities. Moreover, if "blundering and jobbery" are still to be feared, the public may perceive that the Water Companies are not likely to blunder over the business with which they have been familiar for so long a time, neither is it probable that their shareholders will submit to any perceptible jobbery. Sir William Harcourt may lead the House up to a very pretty scheme of Metropolitan municipal government, but no sooner is the problem put before our legislators in a tangible form than certain convictions are pretty sure to arise which will sober some of the present enthusiasm.

Lieut.-Col. Bolton's report for the past month contains, among other analyses of the London Water Supply, those furnished to the Metropolitan Vestries by Professor Wanklyn and Mr. W. J. Cooper. These eminent chemists state that when they commenced their analyses in the latter part of 1880, the result showed "that the condition of the London "Water Supply was excellent." They now say: "Our "analyses, made since that time, have fully confirmed that "favourable report, and show that the water has even im-"proved in quality." Finally these gentlemen declare their belief that "the London Water Supply is one of the best in "the world."

The half-yearly report presented at the recent meeting of the Chelsea Water-Works Company afforded the usual evidence of progress in the Metropolitan Water Supply. The revenue was more than a thousand pounds above the amount received in the corresponding period last year, and the quantity of water pumped up from Surbiton to the Putney Heath reservoirs showed an increase of 36 million gallons. Among the drawbacks of the period were the severe frost of January last, and the disturbance of roadways for the extension of wood paving. The frost was a temporary trouble, but the wood paving disturbance threatens to be a chronic ailment. The Lower Thames Valley main sewerage scheme involved the Company in law costs, but these—as also the expenses connected with the Purchase Bill of last session—have been provided for out of the contingency fund. The report mentions an "unusual number of houses returned as empty." The Governor, Mr. John Deedes, in his address to the meeting, stated that last Michaelmas there were as many as 2226 empty houses in the Company's district. These are said to be mostly new houses, by which we should understand that the district was temporarily over-built. But as the inhabitants of London are multiplying at a rate which has caused the Registrar-General much surprise, we may expect to see the population soon in possession of these empty houses, thus aiding the revenue of the Chelsea Company. For the present the Shareholders may be congratulated on a dividend at the rate of six and a half per cent. per annum on the ordinary stock, and they may look for yet better days to come.

Is a workhouse a dwelling-house? The Liskeard Water-Works Company and the Judge of the Liskeard County Court think it is not. The Board of Guardians of the Liskeard Union think otherwise, and the Lord Chief Justice, with Baron Pollock and Justice Manisty, agree with the Guardians, as will be seen in our "Legal Intelligence." In the eyes of the Lord Chief Justice, "paupers in a workhouse, "under one head, and dining together," are "one family as "much as a nobleman and his servants." We hardly think the paupers would acquiesce in the notion or realize the comparison. The main question at issue was whether the water supply was required for public or domestic purposes. The Company contended for the former view of the case, while the Guardians pleaded the latter. If a workhouse were not a dwelling-house, the Lord Chief Justice wished to know what it was. The learned Counsel for the Company suggested that it was rather like a prison, and was then told that even a prison was a "prison-house." It was contended for the Company that the maintenance of paupers was a public matter, and that therefore the water supply for a workhouse was required for public purposes. But the Lord Chief Justice considered that "in the prosecu-"tion of all public purposes there may be domestic uses—"there may be things for domestic use, and," said his lordship, "this is one." Baron Pollock suggested the analogy of a private school with boarding scholars. It is useless, and may even seem absurd, to challenge the wisdom of such a tribunal, but we confess to a difficulty in looking upon a workhouse as a private dwelling-house, and in viewing the

indoor poor as constituting a family circle. The judgment thus given would apparently decide that a barracks was a dwelling-house, and a thousand soldiers one family. A private boarding-school, it seems to us, is a very different thing from a public workhouse. Baron Pollock said he was glad they were able to decide that a workhouse was a dwelling-house, "because," said the Baron, "it is "manifest that the intention of the Act is to require the "supply of water for all purposes—domestic on the one hand, "public on the other; and if by any ingenuity it was found "there was some supply not provided for, the consequences "would be extremely inconvenient." We cannot see there was any danger of such a deprivation in the Liskeard case. The Company were willing to provide the water on the terms of a public supply, but the Guardians sought to obtain it on the basis of domestic use. The difference is a pecuniary one, and the Guardians will have the benefit of the present decision, the Company receiving £12 per annum instead of £40.

The destruction of town refuse continues to make progress. Bradford, which has made trial of this method, has resolved to extend the works. The system adopted is that of Mr. Fryer, and it is stated that the annual cost is just about a fraction more than tenpence per head of the population. The destructors, in their enlarged form, will serve one-third of the borough, or about 80,000 inhabitants. When the subject was under discussion in the Town Council, one member of the body calculated that the total cost of the undertaking would be something like £37,000, and declared that the expense connected with this "magnificent scheme "of destruction struck him almost with terror." In reply, it was stated that the gentleman's calculations were wrong, and were probably influenced by the fact that he had an interest in an opposition destructor, which was really far more expensive. It appears that three different parties connected with Bradford have each invented a "destructor." In fact, this kind of invention seems likely to be in great demand, the difficulty of disposing of town refuse being a source of serious trouble to the Local Authorities.

THE CASTOR OIL GAS-WORKS AT JEYPORE.

An interesting report by Major S. S. Jacob, on the Jeypore Oil Gas-Works, has just reached us. This establishment was founded by the late Maharajah of Jeypore, who appears to have shared with other native princes of India the desire for the material advantages of European civilization. The apparatus in use was supplied by a German named Hirzel, of Leipzig, who is said to have a patent for this kind of gas-works; although it is difficult to see how such a simple arrangement could form the subject of a valid patent. From the memorandum on the working of the establishment prepared by the present Manager (Mr. S. J. Tellery), whose administration is highly commended by Major Jacob, we gather that the gas is principally produced from castor oil, with the addition, when the castor seed is not available, of poppy, til, or rape seed. According to Mr. Tellery's own records, he produces from one maund of castor oil (82 lbs.) about 750 cubic feet of 26½-candle gas; or 1000 cubic feet of 18½-candle gas; or 1250 cubic feet of 9-candle gas. With other oils the same quantity of material worked to make gas of equal qualities will produce 610 cubic feet, 762 cubic feet, and 914 cubic feet of the respective grades of illuminating power. According to these results, taking the current prices of oils delivered into the works—castor oil being Rs. 11 12a. (22s. 4d.), and the other oils Rs. 10 (19s. 10d.) per maund—the castor oil gas is Rs. 0 10a. 4p. (1s. 3d.) per 1000 cubic feet cheaper than other oil gas.

The works are double in all respects, duplicate sets of retorts, purifiers, &c., and gasholders being erected, for which arrangement no reason is given. It appears that the works were originally intended to make oil and water gas, in the method of producing which the manufacturer's patent probably consisted. For this purpose each set comprised a bench of six retorts in one arch, of which three were used for making oil gas, and the remaining three for decomposing water. This process did not work well, and the first proceeding of the present Manager was to demolish the old settings, and fix each retort separate, so as to be enabled to work one or more, according to requirements. At present two horizontal retorts are used, which are kept at work during about 218 hours per month, and produce something like 98,720 feet of gas in this time. Worked in this way, the cost of manufacture (exclusive of the cost of oil) is as follows:—

	Rs.	a.	p.
Wear and tear	1	3	2¼
Fuel	2	11	7
Labour	0	5	3½
Purification	0	0	4¼
Total cost per 1000 cubic feet =	Rs. 4	4	4¼, or 8s. 6d.

This high charge for manufacturing expenses is, of course, due to the fact of so little gas being required; if the consumption should increase to about 260,000 cubic feet per month, which could be supplied without increased cost for establishment charges, the working expenses per 1000 cubic feet would be reduced to Rs. 2 9a. 5¾p. (5s. 1d.)

The works consist of the round retorts before mentioned, which are now constructed of wrought iron, 8 ft. long and 12 in. to 15 in. diameter. This is the only part of the apparatus which causes expense for renewals. The retorts, not being in constant work, have to be heated for six or eight hours before they attain the proper heat for decomposing the oil. The oil is supplied through a syphon, and great care has to be observed to adjust the supply to the capacity of the retort. If too much is run in, the oil merely distils without gasifying; and if too little, the olefiant gas evolved is subsequently decomposed into marsh gas. The gas passes into an ordinary hydraulic main, and thence into a cooling chamber, whence it is conducted to dry scrubbers filled with coke. Having parted with all its tar and ammoniacal liquor, the gas is passed through the purifiers, which contain a curious mixture or series of purifying materials consisting of dry lime, sulphate of iron and copper, sheep's wool saturated with naphtha, and sawdust. [This looks very much as if the purifiers also have to perform the duty of carburetters, perhaps to correct any mishap arising from overheated retorts, but there is no particular mention of this necessity.] The gas is then passed into the holders, each of which contains 15,240 cubic feet.

The gas is chiefly consumed in the public offices and streets; there are, however, a few private consumers, who are charged by meter at the average cost price, Rs. 18 1a. 8p. (35s. 10d.) per 1000 cubic feet, and appear well satisfied with the supply. Most of the burners in use consume only 1½ cubic feet of gas per hour, which, with this rate of consumption, is equal to from 17 to 18 candles; the gas is therefore of high brilliancy. The street main from the works is 5 inches in diameter, which is considered ample for supplying 1500 lights. One house in Jeypore has 118 lights supplied through an inch service-pipe. The loss by leakage is estimated at about 13 per cent. The supply of premises temporarily, or when situated at a distance, is provided by compressing gas at the works to about three atmospheres by means of a pump driven by one bullock. The compressed gas is then delivered in a wrought-iron receiver to the point of consumption, where it is either transferred into fixed receivers and burnt by the aid of suitable regulators, or is delivered into small portable or service gasholders, and burnt in the usual way. A *ghat*, or landing-stage, two miles distant is thus supplied with 400 cubic feet of gas every day, which is consumed by 30 jets, each burning 1½ cubic feet per hour for nine hours. There have not been any accidents from the distribution of gas in the portable reservoirs, or otherwise. As railway carriages are also supplied with compressed gas, it is evident that the introduction of this branch of service has widely extended the utility of the establishment.

Another peculiarity of the Jeypore undertaking is the necessity that exists for the Manager to unite the attributes of a farmer to his other acquirements, for the purpose of securing a constant and cheap supply of raw material for gas-making. Last year Mr. Tellery personally superintended the sowing of 300 acres with the castor plant (*Ricinus vulgaris*), and the establishment includes a hydraulic oil-pressing apparatus. The process of extracting the oil for carbonizing is as follows:—First, the castor seed is passed through the crusher, when the shells only are broken off. The shells are then picked out by hand, and the seed is again introduced into the crusher, where it is ground to a paste. It is then passed into the heating pan, and after being well heated it is packed into horsehair bags and filled up hot into the press immediately. After about 20 minutes' pressing, the exuding oil being meanwhile collected, the cake is removed and ground over again. It is subsequently heated and pressed a second time, until about 33 or 40 per cent. of oil is obtained from the seed. The labour of preparing and pressing the castor seed costs Rs. 1 1a. 8p. (2s) per maund of oil. The cost of extracting other seed oil is about the same, with the exception of the cost of removing the shells. For generating gas the oil is used as it comes from the press. Formerly, at other places, when the oil-bearing seeds were carbonized for gas without previous treatment in this way, the product was overloaded with carbonic acid from the woody part of the seeds, and correspondingly heavy cost for purification was incurred, which by Mr. Tellery's process is entirely avoided.

When the establishment was first started the cost of manufacturing gas was Rs. 23 2a. 5½p. (45s. 10d.) per 1000 cubic feet; but from the time when the present Manager obtained full powers of working independently the cost has been reduced, over an average of six months' working, to Rs. 18 1a. 8p. (35s. 10d.) per 1000 cubic feet. There will be considerable saving if the Manager succeeds in his castor plantation, and he is confident that during the next twelve months the cost will be brought down to Rs. 13 or Rs. 14 (25s. 9d. to 27s. 9d.). The illuminating power of the gas, as we have said, is such that a burner consuming 1½ cubic feet per hour is equal to 17 or 18 candles, and about 800 cubic feet of purified gas are usually produced from a maund of oil. As a further means of economy, it is proposed to erect an apparatus to burn the tar, which is rather a drug, for the preparation of lamp-black. This is expected to bring in a better profit than the present system of selling the tar at an almost nominal price. It is unnecessary to state further details to show the manifold duties which fall on Mr. Tellery, of the castor oil gas-works, Jeypore, who in that far-distant state is so worthily displaying the fertility of resource and steadfastness of purpose which in other fields might, though of less real beneficence, attract more celebrity to their possessor. The general advantages of gas lighting are never more clearly shown than when, as in the present instance, the methods practised in more favoured localities have to be copied as closely as possible under difficulties which, even if overcome by the gas manufacturers, necessitate the imposition of high rates for the product. The Jeypore establishment has now apparently become a settled industry, and although some serious blunders, if nothing

more, marred the early promise of the concern, all these bad influences have disappeared, and the order and economy which now characterize the administration and working reflect the highest credit on all concerned.

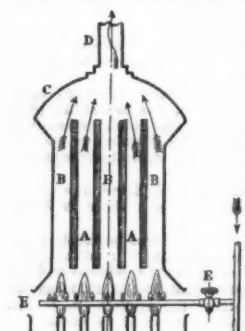
Notes.

A New Powerful Gas-Burner.

A new high-power burner has been introduced by MM. Marini and Gœlzer, which is well spoken of by a portion of the French scientific press. The principle of the construction of the burner is simply in the direction and distribution of the air currents to obtain steadiness, whiteness, and brilliancy of flame. Glass chimneys being unsuitable for shielding the flame in burners of great power, in the present example an internal guide is employed. The burner is circular, consisting of a single line of 250 holes; and, having passed a suitable regulator, the gas is supplied to the interior of the burner by four tubes. In the centre of the apparatus a flash-light is kept burning. The air supply to the main burner is thus arranged: First, an external deflector of crystal causes the outer air to strike against the flame immediately above the holes of the burner; then the internal air current is directed against the ring of flame at a slightly higher point, by means of an inverted cone of copper. Besides this double air supply, which is ordinarily secured in a burner supplied with a glass chimney, there is a further and peculiar arrangement for more completely oxidizing the flame, consisting of an internal cylinder of porcelain pierced with holes and covered with a projecting lid. This cylinder is upheld by a crystal tube, which is carried down to the base of the burner. The consumption of gas by this apparatus is from 40 to 70 cubic feet per hour, according to size; and the burner is ordinarily fixed in a large round lantern, hermetically closed. By a consumption of nearly 50 cubic feet per hour, with a porcelain inner column, an illuminating power of about 160 candles is obtained; with an inner cylinder of glass the duty performed is rather less. The flame produced is said to be round, compact, steady, and long; the strongest wind only agitating it momentarily, without causing it to smoke. Smaller burners are made on the same principles, with a corresponding loss of effect.

A New Gas Heating-Stove.

A so-called "thermo-radiator" for gas has been invented by M. Teissonière, and is described in a communication presented to the Société Téchnique by M. Amiel, and published in their Transactions, from which the annexed diagram is also taken. The arrangement is very simple, and depends on the principle of warming induced currents of air. The stove is cylindrical in shape, and contains two sets of gas-burners, one over the other. The lower sets are Bunsen tubes producing the flames, A, which are developed under the openings of a series of vertical tubes, B, whereby a strong upward current of air is induced, which, becoming heated by contact with the sides of the tubes, is gathered into the chamber, C, and thence finds an exit through the tube, D. The ring burner, E, placed above the Bunsen flames, A, is made to give small and closely-ranged flames, which can only be extinguished by total stoppage of the supply of gas. These small flames, called "safeties," are intended to instantly light the Bunsen burners, so soon as the cock, F, is opened, and also to ignite any gas which may escape from the atmospheric burners from an accidental cause. The result of the united action of the independent sets of burners is that the gas from one cannot escape ignition by the other. There is thus a guarantee that all the gas supplied to the stove is being consumed, and that consequently no explosion can take place. The radiating tubes being made of good conducting material, and the air currents being rapidly heated, the apparatus is said to act well as a warming and ventilating stove; but no particulars of its working are given.



A Gas-Fired Locomotive.

Gas-firing, as applied to locomotive boilers, has had a trial in America, and apparently with some measure of success. The fuel was made by the Holland hydrogen process, which consists essentially of the well-known principle of mixing superheated steam with naphtha. The first locomotive fitted with the Holland apparatus had a kind of furnace containing 352 burners composed of short pieces of upright pipe. In the furnace were also four strong iron retorts connected by iron pipes with the water-tank of the tender, also with an oil-tank on the tender, and with the steam space in the boiler. When sufficiently heated, the retorts pass superheated steam and petroleum vapour together to the 352 burners, which, in turn, keep up the heat of the retorts as well as the boiler. From a carefully noted trial it appears to have taken 2½ hours to get up the full pressure of 120 lbs. in the boiler, 26 gallons of oil having been expended. Naphtha is very cheap in New York, the total cost of the 26 gallons being only 78 cents, or 3s. 1½d. English currency. This was considered to be much less than the cost of coal, and it was calculated that a fast train could be run with petroleum and water gas at a cost of 36 cents (1s. 6d.) per hour. The appearance of the flame is said to be similar to that of pure hydrogen, scarcely visible, but possessing great heating properties. There are no particulars available of the cost of repairs and renewals of the water gas apparatus, nor does it appear that more than one locomotive engine has been fitted with it.

The Velocity of Light.

Dr. J. Young and Professor G. Forbes have recently been engaged in a re-determination of the velocity of light through space, using chiefly an electric arc-light as the source of the luminous rays the velocity of which was to be measured. The final results of these experiments, after making all necessary corrections, gave for the electric light rays a mean observed velocity *in vacuo* of 187,273 miles per second. A curious fact was observed in the course of the investigation, which was that blue rays travel quicker than red rays, the difference being about 1·8 per cent. of the whole velocity of light. It results from this observation that the more the blue rays predominate in any particular light, the greater is its total average velocity. This is also apparently proved by the fact that when the results of Messrs. Young and Forbes' experiments show a superior velocity to the previously recorded estimations, these latter are also found to have been deduced from observations of the setting sun, petroleum, or lime light. In this way the electric light rays are shown to possess a higher velocity than those of the lime light, which is in its turn superior to the rate of emission of the sun near the horizon, the petroleum rays being slower still.

Legal Intelligence.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

TUESDAY, JUNE 21.

(*Before the* LORD CHIEF JUSTICE, *Baron* POLLOCK, *and Justice* MANISTY.)

BOARD OF GUARDIANS OF LISKEARD UNION, APPELLANTS, *v.* LISKEARD WATER-WORKS COMPANY, RESPONDENTS.

This was an appeal against the decision of the Judge of the Liskeard County Court, given on Jan. 19 last year, and reported in the JOURNAL, Vol. XXXV., p. 168. The facts of the case are as follows:—The Water Company sued the Board of Guardians to recover (nominally) three-quarters of a year's rent for water supplied to the Liskeard Workhouse; contending that, under their special Act of Parliament, they could charge at the rate of £40 per annum. The evidence showed that the inmates of the workhouse, inclusive of the officers, numbered about 160 persons, and upon the appellants in the present case applying to the respondents for a supply of water, the latter declined to furnish it at their ordinary domestic rates, upon the grounds that the workhouse was not a dwelling-house within the meaning of the 33rd section of their special Act of Parliament; that the appellants (the Poor Law Union) were not owners or occupiers of any house or part of a house within the meaning of the same section; and that they were not persons entitled to demand a supply of water for the use of the officers and inmates of the workhouse, the latter not constituting one family within the meaning of the Act. The matter being taken before the local County Court, the Judge (Mr. M. Bere, Q.C.) stated it to be his opinion that the contentions on the part of the respondents were right. A case was then applied for and granted, in order that the opinion of this Court might be obtained upon the following questions:—Was the water to be supplied for public purposes? Was it required for private purposes? Were the appellants one family or more?

Mr. CHARLES HALL, on behalf of the appellants, said that the main point in the case was what was the meaning of the words "domestic uses," as distinct from the words "public purposes." The 33rd section of the Company's special Act of Parliament provided that the Company should—at the request of the owner or occupier of any house, or part of a house, in a street where the Company's main-pipes were laid, or of any person who, under the provisions of the Act, or any Act incorporated therewith, should be entitled to demand a supply of water for domestic purposes—furnish the said occupier with a sufficient supply of water for domestic purposes at a rate not exceeding 6 per cent. per annum on the rental value.

Baron POLLOCK: You find the words "domestic purposes" in all Water-Works Acts, and the antithesis is "trade purposes."

Mr. HALL said he should argue that there was nothing in the section dealing with trade or public purposes which included a workhouse or poorhouse. The objects of the Act were that domestic use was not to be interfered with, nor were the cleanliness and comfort of the inhabitants to be interfered with. Water for use in a house, for cleanliness or for enjoyment by the inhabitants, was for domestic use. The 34th section of the Company's Act stated that water for domestic purposes was not for railways, baths, washhouses, nor for horses or cattle, or washing carriages, where the horses or carriages were let for hire or were the property of a dealer, or used for the purposes of any trade, manufacture, or business whatsoever. The 35th section enacted that the Company might supply any person, board, or corporation with water for other than domestic purposes at such a rate and upon such terms and conditions as should be agreed upon between the Company and any such person, body, or corporation. The County Court Judge held that the purpose for which the appellants required the water was not for domestic use. He contended that the Company were in this position: They had, under the powers granted to them by Act of Parliament, practically a monopoly for the supply of water; and it was for them to show that they were not bound to supply the water. If there was any doubt about it, the public ought to have the benefit of the doubt. The 35th section of the Water-Works Clauses Act (10 & 11 Vict., cap. 17) clearly stated that the undertakers should provide and keep in the pipes laid down by them a supply of clear and wholesome water sufficient for the domestic use of all the inhabitants in the town or district within the limits of the special Act who were, as thereinafter provided, entitled to demand a supply, and willing to pay a water-rate for the same. The 36th section dealt with the penalties for neglecting to supply water for domestic purposes; and the 37th section related to public purposes, such as the cleansing of sewers and drains, cleansing and watering streets, and supplying baths and washhouses, &c. He contended that this showed what public purposes were. Commenting upon the 37th clause, he argued that there was nothing whatever in it about the supply being for one family. It merely provided that if there was more than one family, the rate was to be not less than a minimum amount. But in this case the Company were not damnified because the

amount was so much larger, being at the rate of 6 per cent. per annum. Nor was there any restriction whatever as to the number of families in a house. If there was more than one family, there must be a minimum, and he submitted that this was the real meaning of the section. It was admitted that the appellants had offered to pay 6 per cent., and therefore the Company were not damnified in this respect, though they would be if an attempt were made to get the water supplied at a low rate as for one family. The minimum rate was 4s. 4d. for a family, and the amount offered was £12 per annum.

The Lord Chief Justice: There must be 24 families, each with its water-closet, for the Company to get £12.

Mr. Hall said that if there were 30 families the rates would be more than £12. However, the fact he relied upon was that there was nothing in the section excluding the appellants, whether they were a family or not.

Mr. Charles, Q.C., for the respondents, contended that the offer of 6 per cent. per annum on the rack-rent was not enough. The supply of water to the respondents was not for domestic, but strictly for public purposes. Supposing the workhouse were let out to a considerable number of families.

The Lord Chief Justice: Does a family mean relationship?

Mr. Charles admitted that it was very difficult to say.

The Lord Chief Justice inquired whether paupers in a workhouse, under one head, and dining together, were not one family as much as a nobleman and his servants.

Baron Pollock: You would exclude also the case of a private school with boarding scholars.

Mr. Charles said that the other point he relied on was a better one.

The Lord Chief Justice: We may assume the paupers to be a family?

Mr. Charles said he reluctantly acquiesced in the assumption; for he contended that under section 35 of the Act the water was really for public purposes.

Baron Pollock: The washing of paupers and giving them water to drink could hardly be other than domestic purposes.

The Lord Chief Justice said that water for horses and cattle, and for washing carriages, had been held to be for domestic purposes under the Water-Works Clauses Act. Words in the Company's special Act were to have the same meaning as the same words in the general Act, unless there were something in the context inconsistent with such construction.

Mr. Charles argued that public purposes meant those purposes which were described in section 37.

Baron Pollock inquired what was the purpose of a workhouse if it was not for pubic purposes.

Mr. Charles replied that it was for the maintenance of the poor. His only remaining argument was whether a house of this kind really was a house within the meaning of section 33.

The Lord Chief Justice: What is it?

Mr. Charles: It is like a prison.

The Lord Chief Justice: Is not a prison a house? It is sometimes called a prison-house.

Mr. Charles said that the word in the section was "house," and meant dwelling-house.

The Lord Chief Justice held that a workhouse was clearly a dwelling-house; and in giving judgment said: I am of opinion that the appellants are entitled to what they claim in this case upon all the points, and I am clearly of opinion that the workhouse is a dwelling-house within the meaning of the 33rd section of the Company's Act. It has been already held, and Mr. Charles has very properly told us he does not oppose it, that the Poor-Law Guardians are the owners and occupiers of the house for some purpose; but then it is said these occupiers are not supplied with water for domestic use, because the paupers of England are a *quasi*-public body, and the maintenance of the paupers of England, in this large sense, is a public purpose. There is no doubt, in a certain way, that this is perfectly true; but first of all in the prosecution of all public purposes there may be domestic uses—there may be things for domestic use, and this is one. In the second place, we have not to deal with what may be considered a public purpose in a general meaning, but what is a public purpose within the meaning of these two Acts of Parliament. Now, for domestic purposes water is to be supplied at one rate, and for public purposes it is to be supplied at a rate—not fixed in the Act of Parliament, but to be agreed. Mr. Hall's argument, which I confess appears to me to be an unanswerable one when put altogether, and which I desire to adopt, is this: There are two Acts—a public and a private Act. In the private Act the public Act is incorporated, and it is enacted that the words used in the private Act shall have the same meaning as the words used in the public Act, except where it is necessary to construe them in another way. Now, the words "public purposes" in the public Act are confined, by the true interpretation of sections 37 and 43, to certain purposes specified in the 37th section; and amongst these public purposes so specified in the 37th section this is not one. If this remain doubtful, which I do not think it does, the argument is strengthened by the addition, in the 34th section of the private Act, of certain things which, but for the additions, would, under certain decisions of this Court, have been held to be domestic purposes; and those are expressly excluded by the words "public purposes." There public purposes are left by themselves, and then certain other things which had been held to be domestic purposes, are specially exempted by the operation of the 34th section. Therefore, taking these three sections together, it seems to me to be clear that the words "public purposes" in the special Act are to be used in the same sense as the words "public purposes" in the general Act, and the words "public purposes" in the Act do not include this particular purpose—domestic purpose or use. I do not know that there is any other point left except that the paupers are not one family, for the purpose of bringing them within the proviso of the 33rd section. The proviso may be open to the observations which Mr. Charles has made on it, but I prefer to say the proviso does not arise, because in this case it is clear, for the purposes of this Act, the paupers in the workhouse are one family. I will not attempt to define a family, because I am very likely to give a definition out of which some difficulty might arise; but it is quite plain to me, where there is one system, under one organization, carried on in a building, however large, the persons who are all subject to the head of the building, and are all a part of the system or establishment carried on in the building, are, for the purpose of this Act, one family. The mere size of it, as has been pointed out, makes no difference, because there may be a nobleman with as many retainers or servants in his service as the paupers in the workhouse number. It is not essential that they should be connected. This is obvious; first of all because every large family is made up of inmates, many of whom may not be either blood or marriage connections; and, at any rate, besides this, there are the domestic servants, who are never, or scarcely ever, connected by blood or marriage with the persons who are at the head of the family. Yet they are all, for such purposes as this, considered as one family. Then there is the further illustration, suggested by Baron Pollock, of a large school where there may be 30, 40, or possibly 150 or 200 young men or boys, under one head and roof, and under one system of organization in feeding, and for all practical and ordinary purposes one family, although entirely disconnected one with the other, and brought from the four quarters of the globe. I think, therefore, there is nothing in any of the points the respondents have made. I think the County Court Judge was wrong in giving effect to them, and that the appellants are entitled to succeed.

Baron Pollock: I am of the same opinion, and I can only add that I am glad we are able to come to this conclusion, because it is manifest that the intention of the Act is to require the supply of water for all purposes—domestic on the one hand, public on the other; and if by any ingenuity it was found there was some supply not provided for, the consequences would be extremely inconvenient.

Justice Manisty: I also am of the same opinion.

THAMES POLICE COURT.—Thursday, June 23.

(*Before Mr.* Lushington.)

A WATER COMPANY FINED FOR DEFECTIVE SUPPLY.

The *East London Water-Works Company* were summoned by Sarah and Mary Reilly, owners of Sampson's House, Albion Street, Mile End, for unlawfully neglecting or refusing to furnish an adequate supply of water, for which the rates had been duly tendered and paid. There were no fewer than 28 summonses against the Company, for not providing a proper supply of water to the complainants' tenants on different days; but only one summons, which served as a sample of the remainder, was taken.

It appeared that there are on the premises two cisterns 23 feet from the ground, but the adjoining houses are supplied by butts only 4 feet from the ground. Each cistern when full holds about 60 gallons of water, but from the 15th of May to the 19th of June the supply had been insufficient for the wants of the persons living in the house, and they had to borrow water from neighbours. The supply-pipes in the cisterns were in proper order, but the water was laid on for only 20 minutes, and flowed only in dribbles. It was proved that on the 19th of May there was an inadequate supply of water, although if the pipe had flowed freely for the 20 minutes, instead of in the slow manner it did, there would have been sufficient to fill the cisterns.

Mr. Lushington, in the result, said he could not doubt that on the 19th of May the cisterns were not properly filled, and there was not a sufficient pressure of water. He should therefore impose the full penalty of £10 for this offence. The rate had been paid on the houses for the last two years, and the complainants were entitled during the whole of this time to a proper supply of water. They had been losing tenants in consequence of the insufficient supply, and he fined the defendants 20s. and 2s. costs on each of the 27 summonses, and £5 5s. costs, making a total of £44 19s., to be handed over to the persons who paid or tendered the rate.

LAMBETH POLICE COURT.—Thursday, June 23.

(*Before Mr.* Ellison.)

UNFOUNDED COMPLAINT AGAINST A GAS COMPANY.

The *South Metropolitan Gas Company* answered a summons taken out by Charles Wilson, the occupier of certain premises in Station Road, Camberwell New Road, for wilfully failing, after having notice in writing, to furnish a supply of gas.

Mr. Washington appeared for the Company.

Complainant, in his evidence, stated that he rented several billiard saloons, and the premises in question, a railway arch, he used for such a purpose. He denied owing the Company anything.

Mr. Washington, after cross-examining the complainant at some length, urged that the Company had been fully justified in the course adopted. There was power given to cut off the supply of gas, and refuse to renew it whilst any money was due for a former supply. He handed in several papers, which he contended fully showed that the complainant was still indebted to the Company for gas.

In support of this statement he called Mr. *Alfred E. Allen*, one of the collectors of the Company. He was proceeding to call other evidence, when

Mr. Ellison said there was no reason to do so. He was perfectly satisfied that there was collusion between the complainant and others with regard to the tenancy of the premises. The documents produced and the evidence given showed the Company to be quite justified in refusing the supply. He dismissed the summons; and, upon the application of Mr. Washington, made an order against the complainant for £1 1s. costs.

Doncaster Corporation Water Supply.—On Monday last week Mr. E. J. Smith held an inquiry at Doncaster with respect to an application to the Local Government Board by the Doncaster Corporation for sanction to borrow £10,000 to complete their water-works. The Town Clerk (Mr. Shirley) said the water-works had been opened, and the inhabitants were now furnished with a good, plentiful, and excellent supply of water, greatly to the comfort and health of the borough. He stated that the Corporation had already borrowed £160,000, and as they had power to raise £170,000, they applied for the sanction of the Local Government Board to borrow the additional £10,000. There had already been laid out upon the undertaking £165,819 8s. 10d., so that £5819 of the money proposed to be borrowed had already been spent. The estimated cost of the completion of the works was £6787 9s. 11d. Mr. Brundell added that there were still some leakages in the reservoir, and they were dealing with them by a process of burrowing, to meet which £500 was included in the estimates. Reckoning the sums to be paid to noblemen and gentlemen for easements, &c., the Corporation would require £12,607, although they had only sanction to borrow £10,000, and this would close the capital account. After some remarks from the Engineer as to the waste of water, the inquiry concluded.

The Electric Light in the House of Commons.—Further experiments with the electric light were made in the House of Commons last Friday night. In addition to the 12 Brush lanterns in the roof, there were 34 small incandescent lights on the Swan system under the galleries. These lights superseded 64 gas-lights in the roof and 34 gas-jets on the pillars. There was, *The Times* says, a perceptible diminution of heat under the galleries, and the light there was steady and clear. Though some alterations had been made in the deeply-ground glass which encased the opal globes in the roof, no change was observable from the previous experiment. Opinion is still divided as to the comparative merits of the old and new systems of illuminating the chamber. A London correspondent of several country papers says: "The second trial of the electric light in the House of Commons has not produced a more favourable impression than the first. There is great difference of opinion as to the merits of the light, so far as reading by it is concerned, but very few members are enamoured of it. The Swan light under the galleries does its duty in a very perfunctory manner. The light is like that of an oil lamp, and is thrown on the upper panels, where nobody wants it. As a contribution to the illumination the performance of the Swan cannot be highly rated. The Brush light from the roof still flickers very much, and the noise of the engine will sometimes be heard even above the voice of Alderman Fowler. On the whole, the effect suggests that somebody has been trying to make daylight, and has made it very badly."

Parliamentary Intelligence.

PRIVATE BILLS RELATING TO GAS, WATER, ETC.—SESSION 1881.

PROGRESS MADE TO SATURDAY, JUNE 25.

Title of Bill.		Petition for Bill Presented.	Bill Read the First Time.	Bill Read a Second Time.	Bill Reported.	Bill Read the Third Time.	Bill Received Royal Assent.
Aberdeen Corporation Bill	Lords	Commons Bill	March 29	April 7	May 13	May 31	..
"	Commons	Jan. 27	Jan. 28	Feb. 2	March 8	March 28	..
Alnwick Gas Bill	Lords	Commons Bill	May 5	May 13	May 19	May 23	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 7	April 5	April 28	
Barrow-in-Furness Corporation Bill	Lords	Commons Bill	May 5	June 13	June 21	..	..
"	Commons	Jan. 27	Jan. 28	Feb. 2	April 8	May 3	..
Beverley Water Bill	Lords	Commons Bill	April 8	May 12	June 17	June 23	..
"	Commons	Feb. 4	Feb. 7	Feb. 15	March 22	April 7	..
Bingley Water and Improvement Bill	Lords	Commons Bill	March 25	April 4	May 31	June 3	..
	Commons	Jan. 27	Jan. 28	Feb. 2	March 11	March 24	..
Birkenhead Corporation (Gas and Water) Bill	Lords	Commons Bill	April 8	June 2	..	..	..
	Commons	Jan. 31	Feb. 2	Feb. 7	March 23	April 7	..
Bradford Water and Improvement Bill	Lords	Commons Bill	April 8	May 19	..	..	..
	Commons	Jan. 27	Jan. 28	Feb. 4	March 18	April 8	..
Bray Township Bill	Lords	Feb. 18	Feb. 18	Feb. 25	May 24	May 31	..
"	Commons	Lords Bill	June 2	June 20	..	..	..
Brighton and Hove Gas Bill	Lords	Commons Bill	March 15	..	..	..	..
" "	Commons	Jan. 27	Jan. 28	Feb. 14	March 8	March 14	..
Cambridge University and Town Gas Bill	Lords	Commons Bill	March 11	March 21	March 22	March 25	March 29
	Commons	Jan. 27	Jan. 28	Feb. 7	March 1	March 10	
Caterham Spring Water Bill	Lords	Commons Bill	June 13	June 14	..	..	..
" "	Commons	April 29	May 11	May 23	May 31	June 13	..
Cheltenham Corporation Water Bill	Lords	Commons Bill	May 6	May 16	May 27	May 31	..
" "	Commons	Jan. 27	Jan. 28	Feb. 2	April 5	May 5	..
Cleator Moor Local Board Bill	Lords	Commons Bill	May 5	May 13	May 27	May 31	..
" "	Commons	Jan. 27	Feb. 7	Feb. 14	March 15	April 25	..
Colne and Marsden Local Board Bill	Lords	Jan. 26	Jan. 28	Feb. 3	March 15	March 21	..
"	Commons	Lords Bill.	March 28	May 23	June 3	June 17	..
Dudley Gas Bill	Lords	Commons Bill	April 1	April 8	May 24	May 30	..
"	Commons	Feb. 2	Feb. 3	Feb. 15	March 22	March 31	..
Dundalk Water Bill	Lords						
"	Commons	Jan. 28	Jan. 31	Put off for	six months		
Eastbourne Water Bill	Lords	Commons Bill	April 5	May 12	May 19	May 23	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 15	March 18	April 4	
East London Water Bill	Lords	Jan. 28	Jan. 28	Feb. 8	March 7	March 11	..
" "	Commons	Lords Bill	March 14	March 23	..	..	..
Egremont Local Board Bill	Lords	Commons Bill	April 5	May 9	June 24	..	..
"	Commons	Jan. 27	Jan. 28	Feb. 2	March 11	April 4	..
Fylde Water Bill	Lords	Commons Bill	March 31	April 8	May 10	May 13	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 9	March 18	March 29	
Goole and District Gas and Water Bill	Lords	Commons Bill	May 5	May 13	May 20	May 24	..
	Commons	Jan. 27	Jan. 28	Feb. 8	March 18	April 25	..
Hexham Gas Bill	Lords	Commons Bill	March 31	April 8	May 10	May 13	June 3
	Commons	Jan. 28	Jan. 31	March 2	March 18	March 29	
Holland (Parts of) and Sutton Bridge Water Bill	Lords	Commons Bill	April 1	May 23	..	..	..
	Commons	Jan. 31	Feb. 2	Feb. 7	March 22	March 31	..
Hyde Gas Bill	Lords	Commons Bill	April 7	May 9	May 17	May 27	June 3
"	Commons	Jan. 28	Jan. 31	Feb. 14	March 25	April 5	
Irvine Burgh Bill	Lords	Commons Bill	May 17	May 27	May 31	June 3	..
"	Commons	Jan. 31	Feb. 2	Feb. 7	April 1	May 16	..
Kirkcaldy and Dysart Water Bill	Lords	Commons Bill	May 13	May 24	May 27	May 30	June 3
" "	Commons	Jan. 28	Jan. 31	Feb. 7	April 1	May 12	
London Sea Water Supply Bill	Lords	Commons Bill	June 2	June 14	June 20	June 24	..
" "	Commons	Jan. 28	Jan. 31	March 14	May 24	June 2	..
Lower Thames Valley Main Sewerage Board Bill	Lords	Jan. 28	Jan. 28	Feb. 1	Preamble	not proved.	
	Commons						
Matlock Water Bill	Lords	Commons Bill	April 1	May 24	May 27	May 31	..
"	Commons	Jan. 27	Jan. 28	March 2	March 22	March 31	..
Oban Burgh Bill	Lords	Jan. 28	Jan. 28	Feb. 1	March 11	March 22	..
"	Commons	Lords Bill	March 25	April 4	..	..	..
Paisley Water Bill	Lords	Commons Bill	March 22	March 31	April 5	May 5	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 4	March 4	March 21	
Reading Corporation Bill	Lords	Commons Bill	May 27	June 3	..	..	..
"	Commons	Jan. 27	Jan. 28	Feb. 4	April 8	May 26	..
Richmond Gas Bill	Lords	Commons Bill	March 29	April 7	May 12	May 16	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 7	March 15	March 28	
Ryton Local Board (Water) Bill	Lords	Commons Bill	March 25	April 4	April 5	May 31	..
"	Commons	Jan. 31	Feb. 2	Feb. 7	March 15	March 24	..
Sevenoaks Gas Bill	Lords	Commons Bill	March 22	April 4	April 5	April 8	June 3
"	Commons	Jan. 31	Feb. 2	Feb. 21	March 15	March 21	
Sheffield Water Bill	Lords	Commons Bill	March 11	March 21	March 31	April 4	June 3
"	Commons	Jan. 27	Jan. 28	Feb. 7	March 1	March 10	
South Metropolitan Gas Bill	Lords	Commons Bill	May 31	June 13	..	..	..
" "	Commons	Jan. 27	Jan. 28	March 4	May 20	May 31	..
Stalybridge Extension and Improvement Bill	Lords	Commons Bill	May 19	May 30	June 17	..	..
	Commons	Jan. 28	Jan. 31	Feb. 7	March 15	May 17	..
Stirling Water Bill	Lords	Commons Bill	May 31	June 14	June 24	..	..
"	Commons	Jan. 31	Feb. 2	Feb. 7	May 24	May 31	..
Westbury-on-Trym Gas (No. 1) Bill	Commons	Jan. 27	Jan. 28	Feb. 4	Bill withdrawn		
Westbury-on-Trym Gas (No. 2) Bill	Commons	Jan. 27	Jan. 28	Feb. 7	Bill withdrawn		
Westgate and Birchington Gas Bill	Lords	Commons Bill	March 24	April 7	April 8	May 6	June 3
" "	Commons	Jan. 28	Jan. 31	Feb. 7	March 11	March 22	
Woking Water and Gas Bill	Lords	Commons Bill	May 31	June 13	June 23	..	..
" "	Commons	Jan. 28	Jan. 31	Feb. 7	May 17	May 30	..

HOUSE OF LORDS.

MONDAY, JUNE 20.

The Select Committee on the Birkenhead Corporation (Gas and Water) Bill reported that they had not proceeded with the consideration of the Bill, no parties having appeared in opposition thereto.

The Bradford Water and Improvement Bill was referred to a Select Committee, consisting of Viscount Lifford (Chairman), the Marquis of Hertford, Lord Beaumont, Lord Lovel and Holland, and Lord Moore; to meet on Thursday, June 23.

LOCAL GOVERNMENT (GAS) PROVISIONAL ORDER BILL.—This Bill was read the third time, and passed.

A MAN named Hyland, in the employ of the Mountmellick (Queen's County) Gas Company, has taken some land from which tenants had some time ago been evicted, and expressed his intention of grazing his cattle thereon in spite of the Land League. A demand for his dismissal not having been complied with by the Company, the inhabitants in nearly all the houses in the place have turned off their gas, and expressed a determination not to burn any more until Hyland is dismissed from his employment.

SALES OF GAS AND WATER SHARES.—Last Tuesday, at the Auction Mart, Tokenhouse Yard, E.C., Messrs. Fox and Bousfield sold by auction 300 £10 shares in the Lea Bridge District Gas Company, being the first issue of stock under the Company's Act of 1878, and bearing a dividend, subject to the sliding scale, of 7 per cent. The shares were disposed of at the following prices:—30 at £13 5s.; 20 at £13; 20 at £12 15s.; 30 at £12 10s.; 50 at £12 5s.; 80 at £12; 70 at £11 15s. The total amount realized by the sale was £3682 10s., or an average price of £12 5s. 6d. per share. ——On Thursday, Messrs. Cronk sold by auction, at Sevenoaks, some 10 and 7 per cent. shares in the Sevenoaks Gas and Water Companies. Lots 1, 2, 3, 4, each £50 stock in the Water Company, were sold for £71, £70, £70, £70. Lot 5, £66 13s. 4d. stock value, was knocked down for £80. Lots 6, 7, 8, 9, 10, each being two new £20 shares (£14 paid on each share), fetched the respective sums per share of £16, £17 10s., £17 10s., £20, and £18. Lots 11, 12, 13, 14, each consisting of four £10 fully-paid "A" shares in the Sevenoaks Gas Company, bearing 10 per cent. dividend, were all sold at £19 per share. Lots 15, 16, 17, 18, four £10 "B" (first issue) shares in the Gas Company (fully paid up), bearing 7 per cent., realized the following sums per share:—£13, £13, £12 10s., £12 10s. Lot 19, one similar share, was sold for £13. Lot 20, six similar shares, was bought at £12 10s.

Miscellaneous News.

WEST OF SCOTLAND ASSOCIATION OF GAS MANAGERS.

(*Concluded from p.* 1104.)

After the proceedings reported in last week's issue there was the following

MISCELLANEOUS BUSINESS.

Mr. NIVEN said he would like to draw attention to the matter of the publication by the Association of the statistics in regard to gas supply in the West of Scotland. Last year they had not had any such publication, and whether this was from fault or failing he could not say; but he thought the fact he had mentioned indicated a conviction in the minds of the Committee that it was not necessary to publish the list yearly. He did not think it added anything to their knowledge to have the list put into their hands yearly—it would not prejudice the Association or their progress in knowledge, in regard to extensions, apparatus, or manufacture, to alter the publication of the statistical table from once a year to once in three years, and he therefore moved that it be published triennially.

Mr. WILSON (Stonehouse) seconded the motion.

Mr. M'GILCHRIST pointed out that, according to the rules of the Association, notice of such a motion must be given a year before any alteration could be made. While this was the case, he would at the same time mention that a great many subscriptions had been received by the Association on the distinct understanding that the report was to be published annually. He might assure the gentlemen present that it was from no fault on the part of the Committee that the report had not appeared last year, and he saw nothing, from a financial point of view, to interfere with its appearance annually.

Mr. S. STEWART (Greenock) said that, as an honorary member, he thought the publication should take a different and a more convenient shape.

Mr. RENFREW (Langbank) said that, as to the expense of the publication, he did not see why this should interfere with the appearance of the report. The finances of the Association were as good at present as ever they had been.

The PRESIDENT remarked that if members would only come forward and pay their subscriptions, there would be abundance of money to carry out all their schemes.

Ultimately, and after some further discussion, it was remitted to the Committee to consider Mr. Niven's statement, and deal with the matter of arrears of subscriptions as they might see fit.

Mr. AMBROSE (Bo'ness) afterwards exhibited two specimens of pipes which he had taken out of the ground at Bo'ness. Both malleable and cast-iron pipes were, he said, unable to withstand the chemical action of the soil, which was composed of salt-pan ashes. He thought the sea must have worked through it at some time. He should like the members to guide or advise him in the matter.

In answer to Mr. M'Gilchrist, Mr. AMBROSE said he had tried lead pipes, but was not yet prepared to say what the action was upon them. In the pieces of pipes he exhibited, he said there was not a portion of the original iron left.

The PRESIDENT thought that malleable tubes laid in wooden boxes 2 inches square, properly covered with pitch, might be a preventive against the chemical action of the soil. In Port-Glasgow, where the soil was sandy, and made up of ashes, this course had proved satisfactory.

Mr. AMBROSE said he had heard an observation from a gentleman that the pipes might be preserved by covering them with clay. When the Company started in Bo'ness, in the year 1844, nearly the whole of their pipes, both mains and services, had been covered with clay, and it was afterwards found that the parts that were covered were worse than those that were not.

Mr. WILSON corroborated the remarks of the President. In one part of Stonehouse he could not get a pipe to serve more than three or four years. In one instance where a pipe had been in for four years, it proved, upon examination, to have been completely eaten through. He then tried the wooden box and the pitch. This system had now been in use for three years, and there was no leakage in connection with the pipes so laid.

Mr. M'GILCHRIST: Is there a great percentage of leakage in Bo'ness?

Mr. AMBROSE: It is over 20 per cent.

Mr. M'GILCHRIST: In uncovering the earth and applying a light, would you have a flame all along.

Mr. AMBROSE: In the place where I took this pipe the gas burned at once. The pipe was broken in three or four places, and the gas burned in a radius of 8 or 10 feet, and one could scarcely tell where it burned strongest.

Mr. HAMILTON (Maybole) said he approved of malleable pipes coated. He had had pipes in the ground for 44 years, and they were as good now as the day they were put in.

Mr. NELSON said that no doubt the coating of pipes was a great advantage; but he approved of the system of laying pipes in a box, and covering them with pitch. He suggested, however, that a considerable saving of wood might be effected by laying the pipes, not in square boxes, but boxes having only two sides.

Mr. NIVEN said he would now pass from a consideration of the subject of pipes, and deal for a moment with that of purification. Those who read the JOURNAL OF GAS LIGHTING would have observed in its pages recently a suggestive contribution from the chemist of an important gas company in England, in which the writer dealt with the number of seconds taken in passing gas through purifiers. The same important element had been considered in reference to the form of the purifier—whether it was a parallelogram or a square, or, in other words, whether it had greater length than breadth. They all knew full well that far less lime, proportionately speaking, was fouled by gas passing through it in summer than in winter, because the gas took a longer time to permeate the lime. Now he would like, if the members would all assist him in his endeavour, to get up a paper on this question of time, by each of them furnishing data on the following points:—1. The quantity of gas passing through the lime in a purifier, before that lime was fouled, in the months of June, July, and August, and then in November, December, and January. 2. The number of purifiers. 3. Their respective lengths and breadths. 4. The depth of lime. He thought that if he had these particulars he could produce a formula that would be applicable, not only in regard to apparatus, but in regard to economy in the use of lime; and the paper might be interesting to the Association, because it would unify all the data he could obtain from the members. If they did him this favour, he would do the rest.

The PRESIDENT said he was sure every member of the Association would give Mr. Niven every assistance.

Mr. STEEN was then asked to explain one of Mr. W. Cowan's governors, which was exhibited to the meeting. He said the general experience of gas managers agreed with the observations of the Editor of "King's Treatise on Coal Gas," who, in writing about "every cone governor of the usual description," remarked that "any sudden change in the inlet pressure while the governor is in action, causes a variation in the delivery or outlet pressure to the extent due to the variation of the operating force of the gas on the cone base . . . . and when extreme changes in pressure occur, as in the cupping of telescopic gasholders, the disturbing force becomes serious." There would therefore be no difference of opinion regarding the need for a simple means whereby so serious a defect might be remedied. In Mr. Cowan's governor, the power of the inlet pressure to disturb the equilibrium was neutralized by an equivalent force exerted above the roof of the bell. This was effected by the introduction of gas at the initial pressure into a fixed bell, suspended from the cross-bar; and forming a water slide in connection with an annular tank, which was fixed upon, and moved along with the governor bell. This small fixed bell, being of the same area as the cone base, was affected by the inlet pressure to the same degree as the cone itself. Hence the operations of cupping and uncupping telescopic gasholders did not, in this governor, affect the delivery. Three models were exhibited, with a view to show various modes of application; No. 1 model represented a governor of the kind usually known as an air vessel concentric governor, with the addition of Mr. Cowan's compensating slide. In this arrangement, weights were, as usual, employed to give the pressure, and these were formed in segments, and laid on the bell concentric with the annular tank. No. 2 model showed a concentric governor on the counterbalance principle, so far as the support in equilibrium of the bell was concerned. But in this case the loading for pressure was given by water, for which a tank on the roof of the bell was provided. One special feature was the beautiful syphon arrangement for withdrawing the water, and so reducing the pressure. This formed part of another invention by Mr. Cowan, but it was most advantageously applied here, and would be recognized as just the thing required to make water-loading absolutely perfect and generally applicable. No. 3 model showed the compensating slide divided into two portions, which together equalled in area the cone base. The object here was to avoid the necessity, which in some cases would arise, for an alteration in the counterbalance. The two slides were simply added, and no other change was necessary. The whole plan was simple, and appeared to obtain general approval. The evil to be dealt with was well known, and there were many people who would welcome so efficient a means for its removal.

Mr. M'GILCHRIST asked if the governor was yet in practical operation at any works.

Mr. STEEN replied that a few had been sent out, but they were not yet in a position to report upon its practical working.

The PRESIDENT said they were all much pleased at the explanations of Mr. Steen. Messrs. W. and B. Cowan had always been very kind in sending exhibits, and they deserved a hearty vote of thanks for their kindness. He moved accordingly.

NEXT MEETING.

Mr. RENFREW proposed that the next meeting of the Association be held at Dumbarton. It was, he said, ten years since the Association had met there.

Mr. M'GILCHRIST thought it would be in the interest of the Association that a more central place were fixed upon.

After some discussion, however, it was agreed that the next meeting of the Association be at Dumbarton.

This concluded the business of the meeting. In the afternoon the company dined together. Mr. Carlow occupied the chair, and Mr. Dalziel discharged the duties of croupier.

METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following returns—furnished to him by the London Water Companies—of the average daily quantity of water supplied to the Metropolis during last month. From them it will be seen that 152,426,353 gallons, or 692,543 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight), were supplied daily; or 251 gallons (114 decalitres), rather more than a *ton* by weight, to each house, and 35·3 gallons (16 decalitres) to each person, against 35·2 gallons during May, 1880:—

COMPANIES.	Number of Houses, &c., supplied in May, 1880.	Number of Houses, &c., supplied in May, 1881.	Aver. Daily Supply of Water in Gallons* during May, 1880.	Aver. Daily Supply of Water in Gallons* during May, 1881.
Total supply	582,505	607,621	145,745,332	152,426,353
From Thames	279,750	292,465	74,614,416	76,845,609
,, Lea and other Sources	302,755	315,156	71,130,916	75,580,744
THAMES.				
Chelsea	30,071	30,656	9,108,100	9,406,300
West Middlesex	54,327	57,289	11,722,142	11,886,526
Southwark and Vauxhall	89,879	93,837	23,955,758	23,604,378
Grand Junction	41,352	43,588	13,554,816	13,809,705
Lambeth	64,121	67,095	16,273,600	18,138,700
LEA AND OTHER SOURCES.				
New River	130,373	133,219	29,703,000	30,885,000
East London	122,746	129,574	32,285,800	35,596,000
Kent	49,636	52,363	9,142,116	9,099,744

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for May, 1881, as compared with that for the corresponding month of 1880, shows an increase of 25,116 houses, and of 6,681,021 gallons of water supplied daily.

GLASGOW CORPORATION GAS AND WATER SUPPLY.

The report just issued by Mr. W. West Watson, F.S.S. the City Chamberlain, on the "Vital, Social, and Economic Statistics of Glasgow for 1880," contains references to the undertakings of the Gas Committee and the Water Commission; concerning which Mr. Watson says: "They have each been pursuing a steady commercial course, watched over and managed by able commercial men, who can have only the interests of the public and their own reputation to protect." The particulars given are as follows:—

THE GAS COMMITTEE.

The works of the Gas Committee have not required extension during the year, and may not speedily require much amendment, as they were wisely constructed upon a splendid, as well as an elastic scale. The illuminating power of the gas supplied has always maintained, and has generally exceeded, and often much exceeded, the statutory requirement of a light equal to that of 25 candles.

The various connections and extensions of the works are satisfactorily completed, and we may now reasonably expect that any important emendations of the important works of the Committee will not be called into requirement for years to come. The power of production which they possess amounts to the very large extent of 1,300,000 cubic feet per day, and it has never yet, upon any occasion, been taxed to nearly its full responsibility.

In an establishment so enormous, and connections so complicated, there must be an inevitable leakage and loss, and much labour has been

bestowed upon remedying defects and deficiencies, so that the quantity sold and accounted for during the year has been no less than 1,577,466,000 cubic feet. The gross revenue has amounted to £341,274 13s. 1d.; the gross expenditure (including £30,271 13s. 1d. written off capital, for depreciation), to £257,861 4s. 3d.; thus leaving a profit upon the year of £83,923 8s. 10d. to be applied to discharging the claims of the annuities upon stock, the interest upon borrowed money, and the requisite contribution to the statutory "sinking fund." These three items have absorbed £70,141 1s. 3d., leaving upon the operations of the year a surplus balance of £13,782 7s. 7d., and when this is combined with the gain carried forward from the previous years' accounts, there was available for the year commencing on May 31, 1880, a balance of £48,290 13s. 10d. In these circumstances, the Committee felt themselves justified in again reducing the rates; and from 3s. 10d. per 1000 cubic feet, the price to the consumer now stands at 3s. 8d.

I now beg to present some idea of the enormous scope of the great industry which the gas-works encompass, and offer a sketch of this enormous industry, by presenting a vidimus of the gas production in the city of Glasgow, at intervals of five years each, during the long period which extends from 1832 to 1880. I have already alluded to the inevitable leakage and absorption which is sustained during the manufacture and distribution of gas, and of course it cannot be expected for a moment that, in the conduct of this great industry, the whole produce was or could, in connection with so ethereal an element, be realized from a commercial aspect:—

Quantity of Gas Manufactured in Glasgow during the Years from 1832 to 1880.

1832.—Quantity of gas made	. .	100,068,200	cubic feet.
1837. "	" . .	162,605,800	"
1842. "	" . .	198,522,500	"
1847. "	" . .	391,353,000	"
1852. "	" . .	505,285,000	"
1857. "	" . .	697,378,000	"
1862. "	" . .	821,849,000	"
1867. "	" . .	1,119,842,000	"
1872. "	" . .	1,559,190,000	"
1877. "	" . .	1,817,163,000	"
1878. "	" . .	1,777,846,000	"
1879. "	" . .	1,833,678,000	"
1880. "	" . .	1,859,582,000	"

THE WATER COMMISSION.

The total revenue for last year amounted to £140,897 10s. 4d., being almost exactly that of the preceding year, or, at all events, presenting only £318 18s. 6d. of increase. The total expenditure, exclusive of the sum carried to the sinking fund, was £116,944 6s., exhibiting a diminution upon the expenses of the year to the considerable extent of £8784 5s.

The rates remained unaltered, viz.:—Domestic rate within the city and royal burgh of Glasgow, being the limits of compulsory supply, 8d. in the pound; the public water-rate within the same limits, 1d. in the pound. The domestic water-rate, beyond the limits of the compulsory supply, has remained also as before, at 11d. in the pound; and the rates within the general limits of supply for other than domestic purposes are charged according to a published and varying scale.

The purity and abundance of our supply of water remain unaltered; indeed, they are unexcelled in the United Kingdom. As a passing illustration of the former attribute, I may mention that when spending a brief holiday last year at Llandudno, the great watering-place of North Wales, I found that a water supply had just previously been introduced, and that large "card" placards were being distributed to every house, intimating the important fact, and further, that the quality of the water was almost, if not quite equal to that of the famous Loch Katrine, which supplied the city of Glasgow. As to quantity, it is yet unimpaired, for during last year the official returns report the average supply to have been—

From the Loch Katrine works	34,038,249 gallons per day
From the Gorbals works	3,258,152 "
Together	37,296,401 gallons per day.

The revenue for the year amounted to £140,897 10s.

The unapproached purity of our water supply I have adverted to, and it is fully admitted by Dr. Frankland, the Analyst of the City of London; yet how difficult it is to please all men, for in the fierce contest waged over the Loch Katrine Water Bill, between parties in the committee-rooms of Parliament, it is an actual fact that the purity of the water was in reality adduced as an insuperable objection. The opponents of the Bill led evidence to prove that so pure was it, and its influence so potent, that the leaden supply-pipes would be corroded and destroyed, and the inhabitants of Glasgow must inevitably be consumed by lead-poisoning. The scientific evidence on this subject did, I confess, seem very serious, but as the time has long gone by, and the actors in this civic drama have almost all passed away, I may, without mentioning names, allude to an incident in connection with the matter. The fight was tedious, costly, and exhausting, and terms of compromise were at last not unwillingly approached, when a very straightforward friend of mine, but of the opposite party (who told me himself), remarked, "This is all very well, but what of this lead difficulty?" "Don't trouble your mind about that," said one of his own advocates. "*If* the compromise is arranged, our witnesses may possibly become their best evidence." I do confess my ears tingled somewhat.

Years passed on, and the old idea was revived by a scientific friend, who prophesied that the abnormal purity of the water would endanger the numerous steam-boilers around us, and corrode and destroy even our domestic culinary utensils. The latest craze of all is that the rising generation must, from the use of such pure water, and in the absence of certain adulterating ingredients, grow up rickety and worthless. None of these alarming prophecies have yet been realized within my experience, and it does seem to be a little odd that while these vaticinators argue so clearly, they never appear to think of suggesting a remedy. It reminds me of an anecdote I read very long ago, of two rather famous men—Dr. Benjamin Franklin and Thomas Paine, who were unfortunately, in some of their ideas, rather unanimous; when, after a discussion, the sagacious old philosopher wound up the debate by saying, "But don't you think, Tom, that before we abolish the Bible it would only be reasonable to have something as good ready to put in its place?"

HUELVA GAS COMPANY LIMITED.

The Annual General Meeting of this Company was held yesterday at the Offices in Glasgow, when the Directors, in their report for the period which elapsed from the starting of the works of the Company up to March 31, stated that favourable results had accrued "despite the difficulties and losses incidental to the commencing of a new business."

On the 15th of last July, the works and connections to the lamps in the streets were so far completed that the lighting was inaugurated, the formal ceremony of turning on the gas being performed by the Governor of the Province of Huelva, and the Company being represented by DonFrancisco Jimenez, the resident Director in Huelva. The number of lights was at first very small, and the increase came but slowly, as the price of gas was found too dear as compared with oil, and the first cost of the necessary fittings kept many back. Finding that tar and coke could be sold in larger quantities at high prices, and that a lower price for gas would stimulate consumption, it was agreed to reduce the price to 1¼ reales per cubic mètre, instead of 1½ reales; that is, from about 8s. 6d. to 7s. 1d. per 1000 feet, and this has had the expected result, as the Municipality have increased the number of the street lights, and wish still further to do so, and the Rio Tinto Company, and other large consumers, have taken gas, until the number of lights is now about 1000, and tending to increase.

The works of the Company are a thoroughly well built and substantial structure, completely adapted for the manufacture of gas, and are so arranged that any extension necessary from increased consumption will be made at a mere fractional increase of cost. They are situated about ¾ mile from the centre of the town, and within 250 yards of the first lamp, and are on the main road, along which the town will extend. All the coke and tar produced is being sold at good prices. The buildings and accessories are insured against loss by fire. The terms of the concession are being faithfully carried out by the Municipality of Huelva, and all accounts are promptly paid. The accounts are rendered and collected monthly.

The expenditure of capital has been larger than was at first estimated, owing entirely to the large quantity of ground purchased, the erection of a house for the Manager, the greater extent of mains and pipes which the growing consumption demanded, the necessity for providing fittings to be held for sale, and meters to be hired out. The number of £10 shares issued is 1401, leaving of the present capital 99 to place. The net result of the working of the Company since gas was lit until March 31 this year shows a profit of £326 17s. 8d., after debiting all loss by leakage, &c.

It is only since the Company was formed that Huelva has been placed in railway communication with the other parts of Spain by the line to Seville, and now the town is steadily extending, vacant places being built upon, old buildings modernized and shops enlarged. A new railway from Huelva to the Province of Estremadura has just been authorized, and will be commenced this summer. This will bring largely increased trade and movement to the port, and probably cause new industries to be commenced. The Harbour Board have in contemplation the erection of large quays, which are needed, and would result in economies to all consumers of raw material; and a large hotel is about to be built. It is thus hoped that the operations of the Company will extend year by year, and result in growing benefits to the shareholders.

Register of Patents.

APPLICATIONS FOR LETTERS PATENT.

2645.—PINKNEY, C. W., Smethwick, Stafford, "Improvements in gas engines." June 17, 1881.

2669.—ANDERSON, G., Westminster, "Improvements in the construction, setting, and working of gas-retorts, and in the pipe appendages connected therewith." June 18, 1881.

2734.—BREWER, W. J., Rood Lane, London, "Improvements in automatic regulating gas-burners, and in appliances relating thereto." June 22, 1881.

RETURN to the Metropolitan Board of Works of the testings made at the gas-testing stations during the week ending June 22, 1881.

Company.	District.	Illuminating Power. (In Standard Sperm Candles.)			Sulphur. (Grains in 100 Cubic Feet of Gas.)			Ammonia. (Grains in 100 Cubic Feet of Gas.)			Sulphuretted Hydrogen.	Pressure.
		Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.		
The Gaslight and Coke Company	Notting Hill	18·1	16·8	17·7	9·4	8·4	8·8	0·4	0·0	0·1	None.	In excess.
	Camden Town	18·0	17·3	17·7	11·3	9·9	10·7	0·2	0·0	0·1	"	"
	Dalston	18·3	16·9	17·4	13·4	7·5	11·4	0·0	0·0	0·0	"	"
	Bow	17·5	16·9	17·3	15·7	9·8	12·4	0·9	0·7	0·8	"	"
	Chelsea	17·4	16·8	17·0	11·3	8·9	10·4	0·4	0·0	0·2	"	"
	Kingsland Road	17·7	17·4	17·6	12·2	10·3	11·3	0·3	0·1	0·2	"	"
	Westminster (cannel gas)	21·9	21·5	21·6	8·8	6·1	7·6	0·0	0·0	0·0	"	"
South Metropolitan Gas Company	Peckham	17·0	16·5	16·7	11·0	9·1	10·0	0·2	0·0	0·1	"	"
Commercial Gas Company	Old Ford	17·7	16·8	17·2	9·8	8·3	8·8	0·5	0·3	0·4	"	"
	St. George-in-the-East	17·7	17·0	17·4	7·6	5·6	6·5	0·6	0·3	0·4	"	"

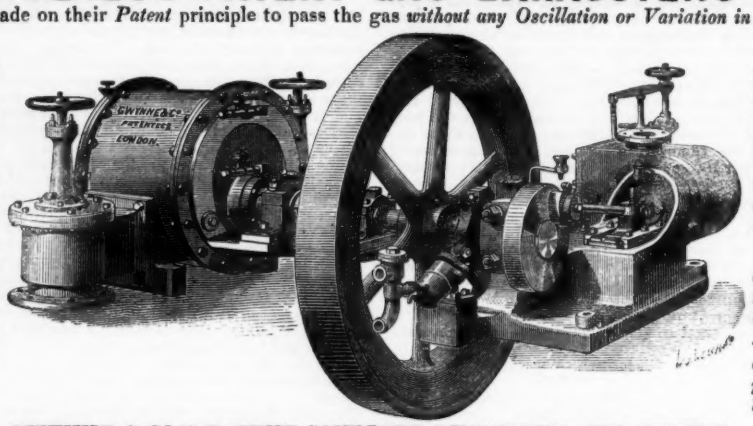
(Signed) T. W. KEATES, F.I.C., Consulting Chemist and Superintending Gas Examiner.

Note.—The standard illuminating power for common gas in the Metropolis is 16 sperm candles, and for cannel gas 20 sperm candles. Sulphur not to exceed 20 grains in the 100 cubic feet of gas at Peckham station, and 17 grains at all other stations. Ammonia not to exceed 4 grains in the 100 cubic feet of gas. Pressure between sunset and midnight to be equal to a column o fone inch of water; between midnight and sunset, six-tenths of an inch.

GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.

Can be made on their *Patent* principle to pass the gas *without any Oscillation or Variation in Pressure.*

THE GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION, and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & Co., for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.



GWYNNE & CO.

Have made the largest and most perfect GAS-EXHAUSTING MACHINERY in the world, and have completed Exhausters to the extent of 14,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.

The Judges' report on the COMBINED EXHAUSTER and STEAM-ENGINE exhibited at the Philadelphia Exhibition is —"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO.'S PATENT COMBINED EXHAUSTER AND ENGINE.

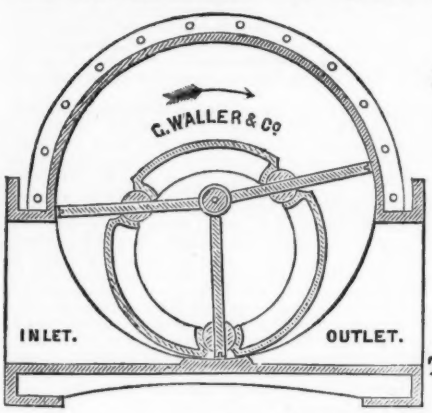
GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers,
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

G. WALLER & CO.'S NEW PATENT GAS EXHAUSTER.



REDUCED OSCILLATION, FRICTION, AND ENGINE POWER.
WORKED BY BELT OR ENGINE COMBINED.

It has also the following Advantages:—

Reduced cost of Engine, Boiler, and Brickwork.
Economy in yearly cost of Fuel, Oil, &c.
Less Slip, and increased Delivery.
Steady working without heavy Fly-wheel.

ALSO MAKERS OF

BEALE'S AND PUMPING EXHAUSTERS,
INDEX, DISC, AND HYDRAULIC MAIN VALVES,
SELF-ACTING BYE-PASS VALVES,
TAR, LIQUOR, AND WATER PUMPS, DIRECT OR BY GEAR,
SCRUBBERS, PURIFIERS, CONDENSERS, BOILERS, &c.

Descriptive Circular of New Patent Gas Exhauster can be had on application.

PHŒNIX ENGINEERING WORKS:

HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of a Pamphlet, prepared for Gas Companies to distribute to Gas Consumers—"Cooking & Heating by Gas;" on Burners, &c.
Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

WANTED, by a Civil and Practical Engineer, a Situation as INSPECTOR of Iron and Brick Work. Specialties: Gas-Works, Tanks and Holders, Bridges (Iron), and Earthworks.
Apply by letter to No. 757, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, a Situation as Working Manager of a Gas-Works. A Fitter by trade, he thoroughly understands the Manufacture and Distribution of Gas, Laying Mains and Services, Fixing Meters, &c. 13 years' experience in the Management of a Gas-Works. Unexceptional references.
Address G. W. S., 74, Hamilton Road, Lower Norwood, SURREY.

WANTED, by a Steady Young Man (abstainer), a Situation at Gas-Works to Fit-up Houses, Fix Meters, and Attend Complaints. Good references.
Apply to W. BROWN, 3, Hartford Terrace, WEYMOUTH.

YOUTH, aged 16, desires to learn Gas Engineering. Has a good taste for Drawing.
State terms, &c., to No. 754, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for a Country Gas-Works making 7 million cubic feet of gas a year, a Competent, Steady STOKER, who has been accustomed to the Management of an Engine and Exhauster.
Apply by letter to No. 756, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO OWNERS OF GAS-WORKS AND COMPANIES.
WANTED to Lease or Work by arrangement, Gas-Works, with a view to the Manufacture of Gas under a new process, whereby the returns are considerably increased.
Apply to ENGINEER, care of W. E Pearse, Chartered Accountant, 4A, CHEAPSIDE, E.C.

WANTED, the present Address of DENNIS MURPHY, formerly at the Gas-Works, North Leach, near Cheltenham.
Any replies will oblige JAMES BOOTH, Hazlehurst, TURTON.

WANTED, Second-hand, two Purifiers, about 6 or 8 ft. square, in good condition.
Address R. KEMP, Bagshot, SURREY.

WANTED, a good Second-hand Gas EXHAUSTER, capacity from 6000 to 10,000 cubic feet per hour.
Apply to Mr. J. H. SILCOX, Manager, Gas-Works, Pembroke Dock, SOUTH WALES.

FOR SALE.—A 1-horse power "Otto" Silent Gas-Engine.
Apply to GEORGE WALLER AND CO., Holland Street, Southwark, S.E.

THE Gravesend and Milton Gas Company have FOR SALE, Four 12 ft. square PURIFIERS, 4 ft. deep, with 12-in. Connections and eighteen 12-in. Donkin's VALVES, together with Lifting Apparatus, all in fair condition, and can be taken possession of immediately; also one 10-in. GOVERNOR, by A. Wright and Co., Westminster. One SCRUBBER, 26 ft. high, 8 ft. diameter.
For further particulars apply to the undersigned.
S. SOWOOD, Manager.

FOR SALE—An Annular Condenser, Tower Scrubber, Station-Meter, Beale's Exhauster, two Boilers, some Hydraulic Mains and Retorts, and some Slide-Valves.
Apply at the Gas-Works, MAIDSTONE.

EXHAUSTER FOR SALE.
THE Perth Gas Commissioners have for Sale a WHIMSTER'S PATENT GAS EXHAUSTING AND WASHING MACHINE—15,000 cubic feet per hour—taken out to make room for a larger one. It is in perfect order, and will be sold cheap.
For particulars, apply to WM. MACLIESH, City Clerk, PERTH.

THE Gloucester Gas Company have the undermentioned APPARATUS for Sale:—
About 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12-in. Slide-Valves and 12-in. Connections.
Exhauster (Jones) to pass about 15,000 feet per hour.
Two Vertical Steam-Engines, each about 6-horse power, with Pulleys, and Shafting used for driving the above.
Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.
Two 12-in. four-way faced Valves, by Cockey.
For further information, &c., apply to the undersigned,
R. MORLAND, Engineer.

COCKERMOUTH GAS COMPANY.
THE above Company invite Tenders for the Purchase of their Surplus TAR and AMMONIACAL LIQUOR for a term of One, Two, or Three years from the 1st of July next.
Tenders to be sent to me not later than July 10.
Further particulars on application to
JOHN PATTINSON, Secretary.
Cockermouth, June 16, 1881.

GAS PLANT FOR SALE.

THE Sheffield United Gaslight Company have the undermentioned GAS APPARATUS, in good condition, FOR SALE, at their Neepsend Gas-Works:—

Two Jones' Exhausters to pass 80,000 cubic feet per hour.
Three " " 40,000 " "
Three Dry Faced Bye-pass Valves (Newton Chambers' make).

Offers for the above to be sent in addressed to the undersigned.

THOS. ROBERTS, Manager.

Gas Office, Sheffield, May 30, 1881.

BANGOR LOCAL BOARD OF HEALTH.

TENDERS FOR GAS COAL.

THE Water and Gas Committee of the above Board invite TENDERS for the Supply of about 2200 Tons of Best Screened GAS COAL and about 250 Tons of Screened CANNEL, to be delivered, carriage paid, to Bangor Railway Station; in such quantities and at such periods as may be required during the Twenty months commencing Nov. 1 next and ending June 30, 1883.

Parties tendering must give full particulars as to the quality of the Coal and Cannel offered, and the name of the colliery from which they propose the supply.

Form of tender may be had on application to the Secretary.

Sealed tenders, under cover, endorsed "Tender for Coal," addressed to the undersigned will be received until July 27, 1881.

F. JONES, Secretary.

Local Board Water and Gas Offices, Bangor, North Wales, June 15, 1881.

AMMONIACAL LIQUOR.

THE Directors of the Barnsley Gas Company are prepared to receive TENDERS for the AMMONIACAL LIQUOR produced at their Works in Barnsley and at Old Mill, for a period of One, Two, or Three years, from the 1st of July next.

Probable quantity, and any other particulars, may be had on application to the undersigned.

The highest or any tender will not necessarily be accepted.

Tenders, addressed to the Chairman, to be sent to me not later than Thursday, June 30, 1881.

JOHN HUTCHINSON, Manager.

Gas Office, Barnsley, June 17, 1881.

CIRENCESTER GAS COMPANY, LIMITED.

TENDERS FOR COAL.

THE Directors are prepared to receive TENDERS for COAL as under:—1200 Tons of Best Real Old Silkstone Gas Coal, screened, to be delivered at Cirencester Railway Station during the next Twelve months, at such times and in such quantities as the Manager of the Gas-Works may direct. Also 1200 tons of Best Forest of Dean Gas Coal, to be delivered as above, and rendered to the Company from the Railway Station in unbroken trucks, the weight being taken from the pit ticket. The Contractor to name the pit from whence the Coal is to come.

TENDERS FOR THE PURCHASE OF COKE.

The Directors are also prepared to receive TENDERS for the Purchase of the Company's COKE, to be removed by the Contractor from the Works as directed by the Manager.

Tenders to be sent on or before the 30th of June inst., to the Gas Company's Secretary, JOHN FEECHAM.

76, Castle Street, Cirencester.

AUDLEY (STAFFORDSHIRE) LOCAL BOARD.

TENDERS FOR MAKING GAS.

THE Audley Local Board require Ten-DERS from competent persons for the carrying on of the GAS-WORKS for the period of Twelve months from the acceptance of the tender.

The tenders to cover the cost of providing all materials and the whole working expenses (including renewals and repairs), with the exception of lighting and extinguishing the public lamps.

The Contractor will be entitled, for his own use, to all coke, gas tar, ammoniacal water, and refuse lime.

The person tendering to reside on the premises, in a house provided for the purpose.

The Board do not undertake to accept the lowest or any tender.

Full particulars as to the duties to be undertaken by the Contractor can be obtained from the Surveyor, Mr. Robert Rigby, of Audley, Staffordshire.

Tenders to be sent to the Chairman of the Local Board (William Rigby, Esq.), at the Local Board Office, Audley, near Newcastle, Staffordshire, marked "Tenders for Gas Making," on or before Monday, the 27th inst.

By order of the Board,

THOMAS SHERRATT, Kidsgrove, Staffordshire, June 14, 1881. Clerk to the Board.

COAL CONTRACT.

THE Directors of the Newmarket Gas-light and Coke Company are prepared to receive TENDERS for the Supply of 2000 Tons Best Screened GAS COAL, to be delivered as required during the year from June 30, 1881, to June 30, 1882.

Tenders, stating price per ton delivered free at the Newmarket Railway Station, to be sent to the undersigned on or before the 11th of July next.

The Directors do not bind themselves to accept the lowest or any tender.

THOMAS WILKINSON, Manager.

Gas-Works, Newmarket, Suffolk, June 13, 1881.

LIGHTING BY GAS VALLETTA, FLORIANA, MARSA, SENGLEA, COSPICUA, AND VITTORIOSA.

Office of the Auditor-General and Director of Contracts, Valletta, June 10, 1881.

SEALED TENDERS will be received at this Office, until Noon of Monday, July 11, 1881, for LIGHTING BY GAS the Streets of Valletta, Floriana, Marsa, Senglea, Cospicua, and Vittoriosa, for a period of 15 years, to date from the 15th of May, 1882; or, for lighting, for the same period, Valletta, Floriana, Senglea, Cospicua, and Vittoriosa by Gas, and the Great Harbour by Electric light.

Tenders to be on the established printed form, supplied by this Office.

The conditions of the contract and further particulars will be made known on application to this Office, or to that of the Crown Agents for the Colonies, Downing Street, London.

Each tender is to be accompanied with a deposit of £200, which sum is to be temporarily lodged with the Receiver-General to be dealt with as stated hereunder; and no notice will be taken of any tender, unless the due fulfilment of this condition be found endorsed thereon by that Officer.

The deposit thus made shall be forfeited in favour of Government, should the party tendering, or the surety, fail to appear for the stipulation of the requisite contract, in the event of the tender being accepted, within three days from the day of the notice given to him to that effect.

The deposits of the unsuccessful tenderers shall be returned to them immediately after notice will have been given to the party whose tender will have been accepted.

Any notarial fees will have to be paid by the Contractor.

The undersigned retains the power of accepting or rejecting all or any of the tenders received.

F. P. HOARE, Auditor-General and Director of Contracts.

NOTICE TO GAS PLANT MANUFACTURERS.

THE Workington Local Board of Health are about to Erect a New Gas CONDENSER and SCRUBBER at their Works in Workington aforesaid. TENDERS for the supplying and erection of same to be addressed under cover to the undersigned, and will be received up to Saturday, July 2, 1881.

Plans and specification may be seen on application at the Board Room.

The lowest or any tender not necessarily accepted.

By order,

J. WARWICK, Clerk to the Board.

Local Board Office, Workington, June 23, 1881.

LUDLOW UNION GAS COMPANY, SALOP.

THE Ludlow Union Gas Company are prepared to receive TENDERS for the Supply of 1100 Tons of Best GAS COAL, delivered carriage free at Ludlow Station between July 1, 1881, and July 1, 1882, at times and in quantities to be regulated by the Company's Manager.

Tenders to be sent in to the Secretary, Ludlow Union Gas Company, Ludlow, Salop, on or before the 5th prox.

The Company do not bind themselves to accept the lowest or any tender.

Ludlow, June 25, 1881.

THE Diss Gas Company invite Tenders for 500 Tons (21 cwt.) of Hoyland Best Screened Large GAS NUTS, to be delivered at the Diss Railway Station as required between Aug. 1 next and April 30, 1882.

Address the SECRETARY of the Gas Company, Diss, NORFOLK, on or before the 6th of July next.

HINCKLEY LOCAL BOARD.

TO COAL PROPRIETORS.

THE Hinckley Local Board are prepared to receive TENDERS for the Supply of about 3000 Tons of GAS COAL between the 1st of September, 1881, and the 1st of June, 1883, to be delivered in such quantities and at such times as may be required, carriage free at the Hinckley Railway Station.

Tenders, to be addressed to the Chairman of the Gas Committee, Hinckley, endorsed "Coal Tender," will be received not later than Monday, the 18th of July next.

Terms of conditions and further information may be had on application to the Manager at the Works.

The Board do not bind themselves to accept the lowest or any tender.

By order,

SAML. PRESTON, Clerk to the Local Board.

Hinckley, June 22, 1881.

BOROUGH OF NEWBURY—GAS DEPARTMENT.

TO COLLIERY PROPRIETORS AND COAL MERCHANTS.

THE Gas Committee of the Corporation of the above Borough are prepared to receive TENDERS for the Supply of 1500 Tons of GAS COAL, the supply to commence from the 1st of October next, in such monthly quantities as shall be required by the Manager.

The Coals to be delivered, carriage paid, on the Corporation siding at their New Gas-Works, Greenham, Newbury.

Persons tendering are requested to specify the colliery from which they propose to take their supply, accompanied where practicable with a working analysis.

Tenders to be marked "Tender for Gas Coal," and are to be sent in not later than Thursday, July 7, 1881.

The Gas Committee do not bind themselves to accept the lowest or any tender.

By order,

H. B. GODWIN, Town Clerk.

Northbrook Street, Newbury.

TO GAS ENGINEERS AND MANAGERS.

I Have pleasure in intimating my Re-MOVAL to New and more Commodious Premises, situated at 11, Bothwell Street (adjoining *Central* Railway Station) where I hope to receive a continuance of your favours.

D. M. NELSON, Contracting Engineer.

Depôt for Gas and Water Works Apparatus and Fittings,

11, Bothwell Street, Glasgow, June 4, 1881.

BOROUGH OF BURTON-ON-TRENT.

THE Gas-Works Committee of the Burton-on-Trent Corporation are prepared to receive TENDERS for the Surplus TAR produced at their Works for One year, delivered into Contractors' tank trucks on the Gas-Works railway siding.

Payments to be made monthly, net cash.

The surplus quantity is estimated at 600 tons, but the same cannot be guaranteed, as it may be more or less.

Further particulars may be had on application to the undersigned.

Sealed tenders, to be addressed to the Chairman, endorsed "Tender for Tar," to be sent in not later than July 2, 1881.

The Gas Committee do not bind themselves to accept the highest or any tender.

JOHN MUDIE, Engineer.

Gas-Works, Wetmore Road, Burton-on-Trent, June 18, 1881.

CLEATOR MOOR LOCAL BOARD WATER-WORKS.

TENDERS FOR SUPPLY OF PIPES.

THE Cleator Moor Local Board are pre-pared to receive TENDERS for Supply of Cast-Iron PIPES (about 165 tons).

Drawings, specifications, and conditions can be obtained from the Office of Messrs. Strongitharm and Johnston, New Lowther Street, Whitehaven.

Sealed tenders, endorsed "Tender for Pipes," will be received at the Public Office, Cleator Moor, on or before July 4, 1881.

The Board do not bind themselves to accept the lowest or any tender.

Public Offices, Cleator Moor, June 16, 1881.

CITY OF CARLISLE.

TENDERS FOR COAL AND CANNEL.

THE Carlisle Gas Committee are pre-pared to receive TENDERS for the Supply of about 11,000 Tons of Screened or Unscreened GAS COAL and about 2000 Tons of CANNEL, to be delivered in Carlisle in such quantities as may be directed, from July, 1881, to June, 1882.

Tenders, specifying the description of the Coal or Cannel, the pits at which they are raised, and the terms for net monthly payment, are to be sent to me on or before June 30, 1881.

J. HEPWORTH, Engineer and Manager.

Gas-Works, Carlisle, June 10, 1881.

BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Hali-fax Corporation are prepared to receive TENDERS for the Supply and Erection of a Telescopic GASHOLDER, 180 ft. in diameter and 60 ft. in height, and Standards, Girders, Inlet and Outlet Pipes, and Valves connected therewith.

Plans and specifications may be seen at the Gas-Works, and forms of tender together with bills of quantities obtained on application to Mr. Wm. Carr, Gas-Works Manager, on payment of Two Guineas (which will be returned to those parties who send in *bona fide* tenders).

The Committee do not bind themselves to accept the lowest or any tender.

Tenders, endorsed "Tender for Gasholder," must be sent to me on or before the 6th of July next.

By order,

KEIGHLEY WALTON, Town Clerk.

June 3, 1881.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

OXIDE OF IRON,

Suitable for Gas Purification Purposes.

Gas Companies can be supplied with the best quality of Natural Irish Oxide, shipped direct from the extensive Estates in Donegal of the Earl of Leitrim and Wybrant Olphert, Esq., D.L.

For Terms, References, and Particulars, apply to

JOHN BEATTIE, Manager, FALCARRAGH, Co. DONEGAL.

GAS-WORKS CLAUSES ACT AMENDMENT ACT, 1871.

Under the well-known recent decision of the Courts of Law, this Act applies to all Gas Companies in whose Special Acts the Gas-Works Clauses Act of 1847 is incorporated. The following will therefore be found useful:—

ANNUAL ACCOUNTS OF GAS COMPANIES.—Blank Forms of Accounts, arranged as required by the 35th Section of the above-named Act (34 and 35 Vict., cap. 41). These Forms have been printed on large sheets of paper of the best quality, and are carefully ruled so as to afford the utmost facility for compliance with the provisions of the Act. Price 3s. 6d. per dozen. A Specimen Sheet on receipt of Six Postage Stamps.

THE GAS COMPANIES' EXPENDITURE JOURNAL.—Being a Ruled Account Book with Printed Headings, and Analyzing Guide for Keeping, upon the easiest and most correct method, the Expenditure of a Gas Company, in accordance with the provisions of the above-named Act. Arranged by Mr. EDWARD SANDELL. Prices, half bound, cloth sides, 2 quires, 30s.; 3 quires, 36s.; other sizes and bindings to order.

London: WALTER KING, 11, Bolt Court, FLEET STREET.

Now Ready, in Pamphlet Form; Price 6d., post free.

OBSERVATIONS on Glass as an Obstructor and Reflector of Artificial Light. By F.W. HARTLEY, A. Inst. C.E., Hon. Memb. British Association of Gas Managers. Being a Series of Three Articles reprinted from the JOURNAL of Jan. 11, 18, 25, 1881.
London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

NEW Work on Municipal Gas and Water Supply. Just published in one Volume, royal 8vo., 5s. 6d. (postage 5d.), cloth, "The Purchase of Gas and Water-Works, with the Latest Statistics of Municipal Gas and Water Supply." By ARTHUR SILVERTHORNE, Consulting Engineer.
CROSBY LOCKWOOD AND CO., 7, Stationers' Hall Court, LONDON, E.C.

PRINTED FOR DISTRIBUTION BY GAS COMPANIES AND CORPORATIONS.

THE Value of Paraffin Oil as an Illuminant, COMPARED WITH COAL GAS.
Being an article contributed to the JOURNAL of May 3, by F. W. Hartley, A.I.C.E., Hon. Memb. British Association of Gas Managers. Arranged as a 4 pp. fcap. leaflet. Price 10s. per 100.
London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

Now ready, Fscp. fo., in Coloured Wrapper, price 2s. 6d., post free.

THE TRANSPORT OF MATERIALS FOR GAS-WORKS.
Illustrated by the Plans of the York, Newcastle-on-Tyne, and Beckton Gas-Works.
A Series of Articles Communicated to the JOURNAL OF GAS LIGHTING, &c.
By V. WYATT,
Constructing Engineer to The Gaslight and Coke Company.
Accompanied by three lithographed Plans of the Works referred to, and the Board of Trade Specimen Plan of Gas-Works.
London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

TO GAS COMPANIES AND MUNICIPAL AUTHORITIES SUPPLYING GAS.

CONSPIRACY AND PROTECTION OF PROPERTY ACT, 1875.

It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of the above Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.
Printed copies of the Section, in large type, on broad sheets, may be had of WALTER KING, 11, Bolt Court, Fleet Street, E.C. Price 2s. per dozen, or 10s. 6d. per 100, post free.
The Act extends to Scotland and Ireland.

FOSTER, HIGHT & CO.,
CHARTERED ACCOUNTANTS,
3, COPTHALL BUILDINGS, BANK, E.C.
IMPROVED FORMS FOR ALL BOOKS USED BY GAS COMPANIES ON A
CHECK SYSTEM,
ADAPTED TO THE REGULATIONS OF "THE GAS-WORKS CLAUSES AMENDMENT ACT, 1871."
FORMS OF ANY BOOK SENT ON APPLICATION.

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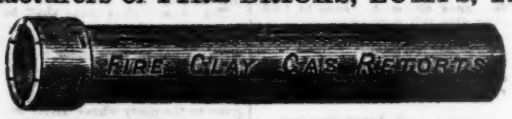

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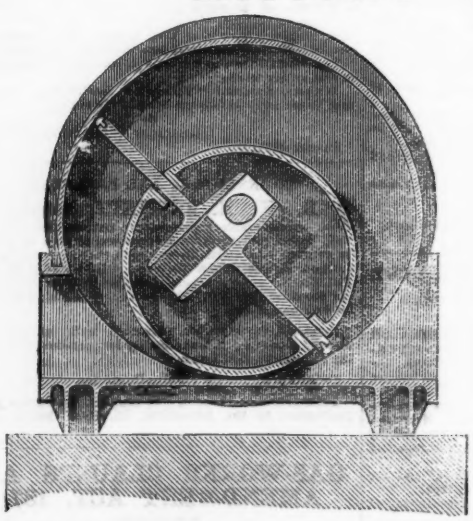

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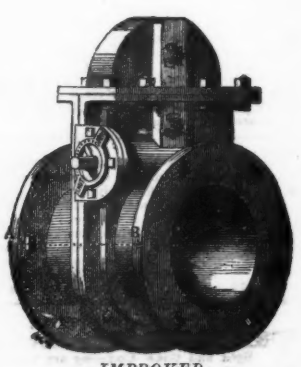

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